User's Guide

Microsoft®

QUERY

User's Guide

Microsoft® Query

Version 1.0

Microsoft Corporation

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INTRODUCTION

Introducing Microsoft Query

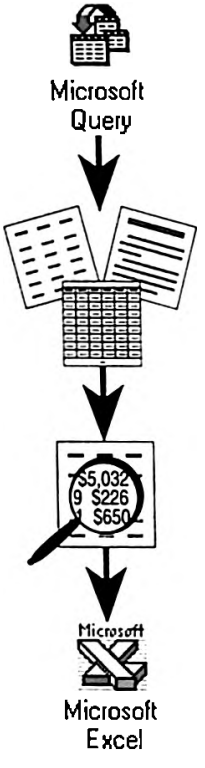
Welcome to Microsoft® Query for Microsoft Windows™ and Microsoft Query for the Apple® Macintosh®! This section introduces you to Microsoft Query, shows you how to start it, and gives you an action plan for learning how to use it.

Generally, the features in Microsoft Query for the two operating environments are identical. However, when instructions differ, you'll see a qualification such as "In Microsoft Query for Windows" or "In Microsoft Query for the Macintosh." Follow the instructions that apply to your version.

Similarly, most of the illustrations in this book apply to both environments; however, for dialog boxes that list file names, only the Microsoft Windows version of the illustration appears. If you're working with Microsoft Query for the Macintosh, you would see a comparable dialog box that doesn't use MS®-DOS–type file names.

What Is Microsoft Query?

Microsoft Query is a simple but powerful graphical tool that you can use to retrieve and organize data from a variety of sources, including those in the following formats: Microsoft Excel, Microsoft FoxPro®, Microsoft Access®, Paradox®, dBASE®, Microsoft SQL Server, ORACLE® Server, text, and Btrieve®. (Drivers for some of these sources come with Microsoft Query. If you need additional drivers, contact Microsoft or Apple for information about available drivers.) You tell Microsoft Query what data you want and how you want it ordered and displayed.



You can use Microsoft Query to:

- Seamlessly access data you already have.
- View, edit, and organize the data.
- Insert the data into a Microsoft Windows- or Macintosh-based application file, such as a Microsoft Excel worksheet.

For example, you may want to see a customer list, all the data about a certain product, or sales information sorted by order amount. Microsoft Query can get the data you want, display it so you can study it or change it easily, and even calculate totals for you. If you like, you can insert the data that results from a query into a Microsoft Excel worksheet so you can include it in a report, print it, or work with it further.

Where Do I Start?

Right here! This introduction will help you get ready to work with Microsoft Query. Chapter 1, "Getting Started with Queries," walks you through the process of creating a new query. The rest of this book explains how to perform specific tasks in Microsoft Query, such as how to see just the data you want and how to change the way your data is displayed.

You work with Microsoft Query using either a mouse or the keyboard. Some of the procedures in this book include keyboard shortcuts. If you're using Microsoft Query for the Macintosh, here are two guidelines to remember:

- Shortcuts that include the following keys are available only on an extended keyboard: the function keys (F1, F2, and so on) and the HOME, END, PAGE UP, and PAGE DOWN keys.
- The ENTER key and the RETURN key are equivalent; however, this book refers only to the ENTER key.

To see a summary of all keyboard techniques, search Help for "keyboard use."

What Else Is There Besides This Book?

In addition to this book, Microsoft Query comes with Cue Cards and online Help. In Microsoft Query for Windows, sample data is also included.

Using Cue Cards

Cue Cards is an online coach that provides step-by-step guidance to help you learn Microsoft Query as you create your own queries. Cue Cards walks you through the entire process of creating a simple query, and you can do your own work as you learn.

▶ **To open Cue Cards**

- Choose Cue Cards from the Help menu in Microsoft Query for Windows or from the Window menu in Microsoft Query for the Macintosh.

Using Help

Help provides reference and "how to" information for Microsoft Query tasks not covered in Cue Cards. By clicking underlined text in Help, you can jump from one Help topic to related Help topics. You can also jump from Help to Cue Cards if you want step-by-step instructions for a specific task.

▶ **To get Help**

- In Microsoft Query for Windows, press F1.

  In Microsoft Query for the Macintosh, press COMMAND+SLASH (/).

  -Or-

  To see the Help Contents screen, choose Contents from the Help menu in Microsoft Query for Windows or Help from the Window menu in Microsoft Query for the Macintosh.

  –Or–

Help button

For Help on a specific command or window element, click the Help button on the toolbar, and then choose the command or click the part of the screen you want Help on. You can also press SHIFT+F1 in Microsoft Query for Windows or SHIFT+HELP or COMMAND+SHIFT+QUESTION MARK in Microsoft Query for the Macintosh, and then click the item you want Help on.

Searching Help for a Topic

This book includes cross-references to specific Help topics. When you see "search Help for..." use the Search dialog box in Help to search for a given word or phrase.

▶ **To search for a Help topic**

1. In Microsoft Query for Windows, choose Search from the Help menu (or, if Help is already open, choose the Search button at the top of the Help window).

   In Microsoft Query for the Macintosh, choose Help from the Window menu, and then choose the Search button at the top of the Help window.

   Microsoft Query displays the Search dialog box.

2. In the uppermost box, type the first few letters of a word or phrase relating to the topic you want to search for.

   As you type, Help displays new words and phrases in the list box directly below the one you're typing in.

3. Double-click the word or phrase related to your subject (or select it, and choose the Show Topics button).

   The box in the lower portion of the dialog box displays the relevant topics for the word or phrase you selected.

4. In this lower box, double-click the topic you want to go to (or select it, and choose the Go To button).

Using the Sample Data—Northwind Traders

One way to learn how to use Microsoft Query is to experiment with it using sample data. Microsoft Query for Windows comes with sample data from Northwind Traders, a fictional import/export company that specializes in gourmet foods from around the world. Many of the examples in the Microsoft Query documentation are based on the Northwind Traders data, which is in dBASE format. Although this data is not available with Microsoft Query for the Macintosh, you'll still find the examples helpful as you learn Microsoft Query.

More Information To see the contents and structure of the Northwind Traders data, see Appendix A, "The Northwind Traders Sample Data."

How Do I Start Microsoft Query?

You can start Microsoft Query for Windows from the Windows Program Manager and Microsoft Query for the Macintosh from the Macintosh desktop. You can also start Microsoft Query from within a Windows- or Macintosh-based application such as Microsoft Excel.

Note For instructions on how to install Microsoft Query, see the documentation for the application that Microsoft Query came with.

▶ **To start Microsoft Query for Windows**

1. In the Windows Program Manager, open the group that contains the Microsoft Query icon.
2. Double-click the Microsoft Query icon.

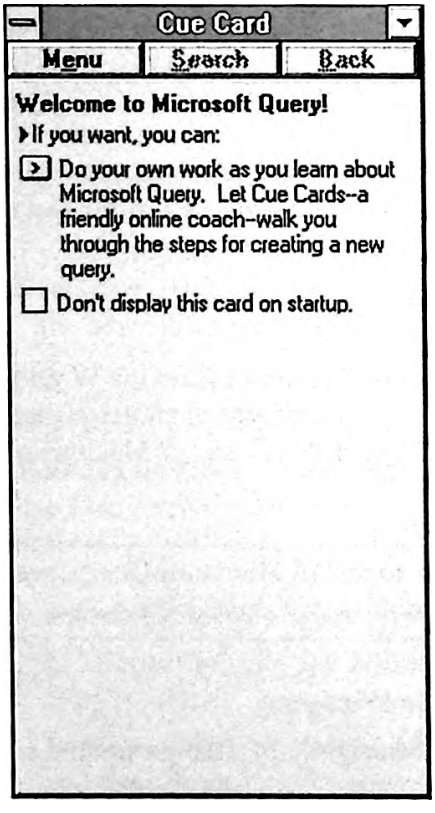
▶ **To start Microsoft Query for the Macintosh**

1. On the Macintosh desktop, double-click the folder where you installed Microsoft Query.
2. Double-click the Microsoft Query icon.

To learn how to start Microsoft Query from within Microsoft Excel, see Microsoft Excel Help. To find out how to start Microsoft Query from within another

Windows-based application or a Microsoft application for the Macintosh, refer to the documentation for that application.

The first time you start Microsoft Query, you're greeted by a Welcome screen, which asks if you want to use Cue Cards to create or open a query.


Cue Card
Menu
Search
Back
Welcome to Microsoft Query!
If you want, you can:
Do your own work as you learn about Microsoft Query. Let Cue Cards--a friendly online coach--walk you through the steps for creating a new query.
Don't display this card on startup.

You can let Cue Cards walk you through the process of creating or opening a query, or you can create a query by following the steps in Chapter 1, "Getting Started with Queries," in this book.

CHAPTER 1

Getting Started with Queries

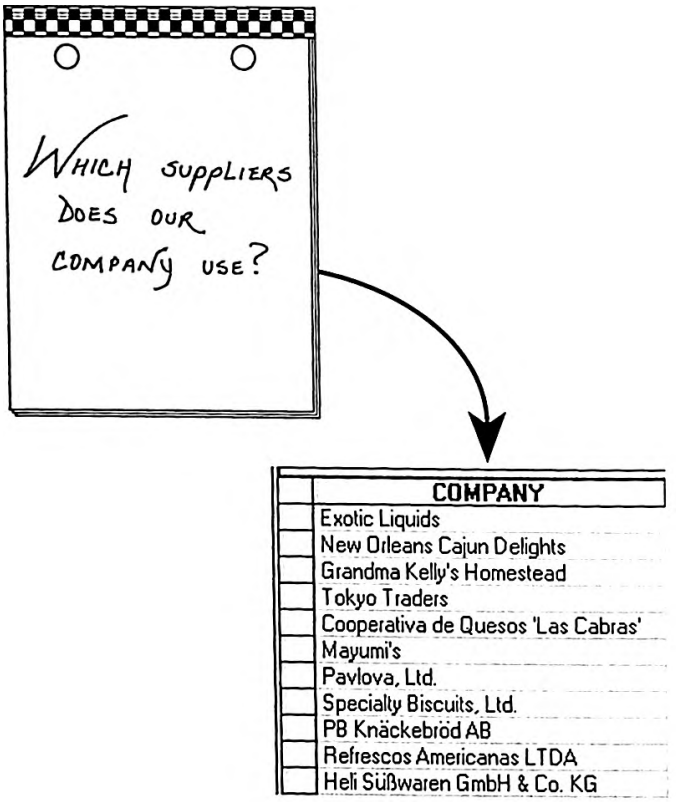
This chapter introduces you to queries—what they are, why you use them, and how you create them. If you've never worked with queries, or if you just want a quick tour of Microsoft Query, this chapter is for you.

In this chapter, you'll learn:

- What a query is.
- Why you use queries.
- Terms you should know before you begin.
- How to use the toolbar.
- How to create a query.
- How to save a query.
- How to close a query.
- How to open a query.
- How to quit Microsoft Query.

What Is a Query?

A query is a specific question you ask about your data, such as, "Which suppliers does our company use?" or, "Which orders were placed in May?" When you run a query, it responds with the data that answers your question.



Why Use Queries?

You use a query when you want to retrieve all or part of a set of data that is stored outside Microsoft Query, in a different application in another location.

Using Microsoft Query, you can do more than just retrieve data, however. You can also:

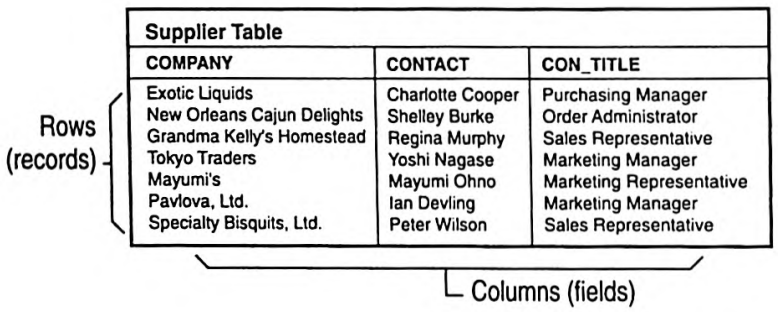
- **Add and edit data** You can use your query to update the data in the place where it's actually stored.
- **Limit data** You can specify criteria that data must meet to be included in the query's answer. That way, you can filter out any data that isn't relevant to your specific need. For example, you may be interested in seeing sales figures, but only those for a certain month.
- **Perform calculations** You can perform calculations on the data you're retrieving. For example, you can calculate the monthly sales for each salesperson or the average unit price of the products your company sells.
- **Format data** You can change how the data looks in your query, creating a layout that works best for you. For example, you can display your data in a different font or in different arrangements.
- **Sort data** You can display data in a specific order. For example, you can sort customer data alphabetically by last name.
- **Transfer data to files in other applications** Once you've retrieved the data you need, you can copy it for use in another application. For example, you can copy your data to a Microsoft Excel worksheet or to a Microsoft Word document.

Terms You Should Know Before You Begin

Microsoft Query retrieves data from *tables*. Tables store data in columns (or "fields") and rows (or "records"). Some examples of tables are Microsoft Excel worksheets, text files with data organized in tabular format, ORACLE Server or SQL Server tables, and dBASE files.

Each table stores a collection of data, usually about a particular topic. For example, in the Northwind Traders data, one table stores data about the suppliers the company deals with, and another table stores data about the products the company sells.

A *field* in a table is a category of information, such as last name or order amount. A field is represented as a column in a table. In the following example, COMPANY, CONTACT, and CON_TITLE are fields that contain information about the suppliers that Northwind Traders uses. A *record*, on the other hand, is a collection of information about one person, event, or thing, such as the Exotic Liquids company. A record is represented as a row in a table. Each record in a table contains the same set of fields, and each field contains the same type of information for each record.



To access data in tables, Microsoft Query can use a variety of *data sources*. A data source includes the data you want to access and the information needed to get to that data. One example of a data source is a SQL Server database, the server on which it resides, and the network used to access that server. Another example is a directory or folder containing a set of dBASE files.

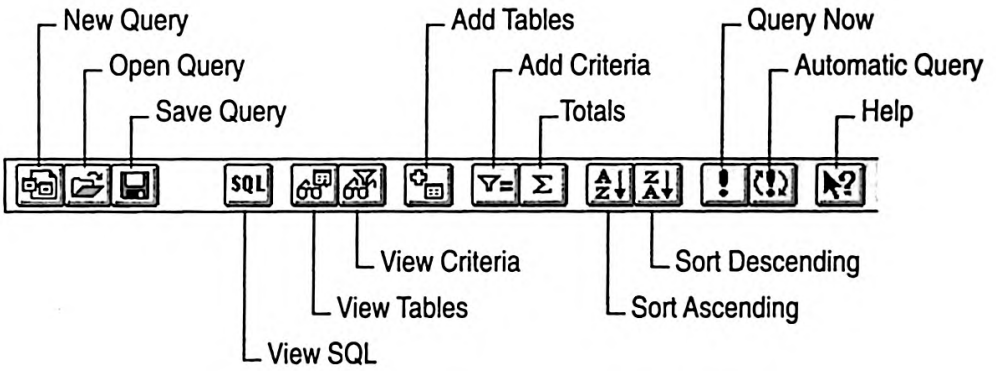
For each query you create, you choose the specific data source you want Microsoft Query to use. The data source tells Microsoft Query the type of table or tables the data is stored in, such as spreadsheet files created in Microsoft Excel, files created in dBASE format, or tables created using ORACLE Server.

Some types of data sources group related tables together in a *database*. A database is like a file cabinet, and the tables are like the individual files in the drawers. All the information in the file cabinet is related to the same subject, such as your company's sales and inventory, and each file contains information about a specific topic under that subject, such as the company's products, customers, and orders. And just as you can use more than one file cabinet to store information about different subjects, a data source can use more than one database.

Note Some data sources use the equivalent of a database but refer to it by a different term, such as "qualifier" or "scheme." Microsoft Query uses the term specific to your data source.

Using the Toolbar

As soon as you start Microsoft Query, you'll see its toolbar under the row of menus at the top of the application window. As you're creating or editing a query, you might find it convenient to use the toolbar buttons, which provide shortcuts for choosing certain commands from the menus.



Help button

Throughout this book, when a procedure suggests a toolbar button to use, a picture of the button appears in the margin next to the procedure. For a description of each button, click the Help button, and then click the button you want to learn about (or search Help for "toolbar").

Note If you start Microsoft Query from another application, the Microsoft Query toolbar includes an additional button that you can use to exit Microsoft Query and insert data from a query into the other application. (The name of this button depends on the application you're using.) For more information, see the additional Microsoft Query documentation for that application.

Creating a Query

To create a query, you select the data source you want Microsoft Query to use, add the tables that contain your data, and then choose fields from the tables to use in your query.

Selecting a Data Source

When you select a data source, you're telling Microsoft Query where to find the data you want, which route to take to retrieve it, and what kind of data to retrieve.

▶ To select a data source

- From the File menu, choose New Query.

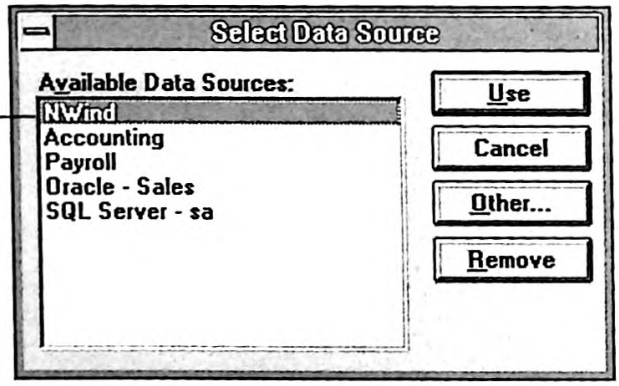
  -Or-

  Click the New Query button on the toolbar.

New Query button

Microsoft Query displays the Select Data Source dialog box. The Available Data Sources box lists the data sources you've previously used in Microsoft Query; these are the data sources currently available for querying. If the data source you want is listed, double-click it (or select it, and then choose the Use button).

Double-click a data source, or select it, and then choose the Use button.



Note Some data sources display an additional dialog box requesting more information, such as a user ID, password, database, and directory or folder. The dialog box you see varies depending on the data source you're using. For example, some dialog boxes may have an item labeled "database" that enables you to choose the group of tables you want to use. Other dialog boxes may have an equivalent item but use a different label, such as "qualifier." Also, some items in this dialog box may be disabled if you have previously provided that information.

If you haven't previously used a particular data source in Microsoft Query, it won't appear in the Available Data Sources list in the Select Data Source dialog box and consequently won't be available for querying. Before you can select the data source, you have to make it available.

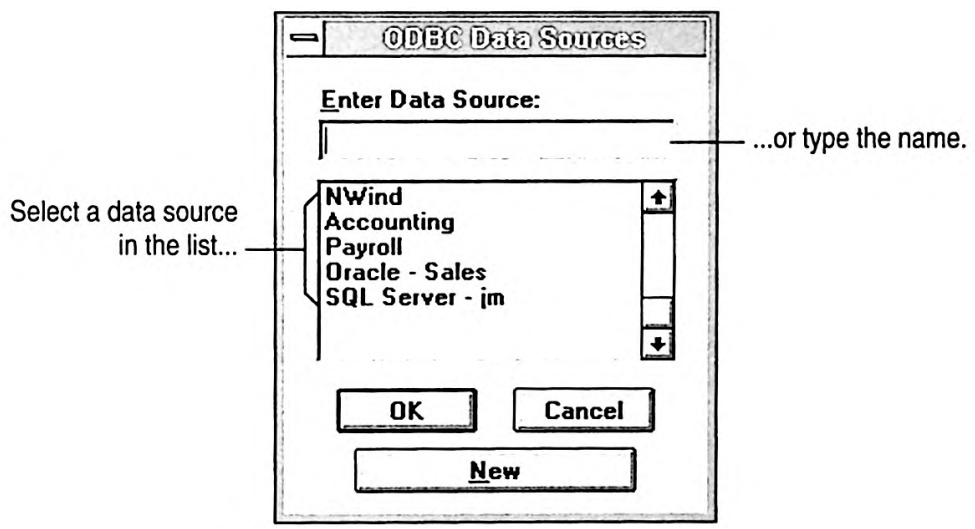
▶ To make a data source available for querying

1. In the Select Data Source dialog box, choose the Other button.

   Microsoft Query displays the ODBC Data Sources dialog box, which lists all the data sources installed on your computer (including those that you've used previously and so already appear in the Available Data Sources list). You can make any of the data sources in the list available for querying.

   Note If the data source you want isn't listed in the ODBC Data Sources dialog box, use the New button to define new data sources for drivers already installed on your machine. For more information, see Appendix B, "ODBC Drivers: Requirements, Installation, and Adding Data Sources."

2. Double-click the data source you want to use (or select it, and then choose the OK button).



   Note Some data sources display an additional dialog box requesting more information, such as a user ID, password, database, and directory or folder. The dialog box you see varies depending on the data source you're using.

   Microsoft Query redisplays the Select Data Source dialog box, which now includes the data source you selected in the Available Data Sources list.

3. Choose the Use button to use this data source for your query.

Unless you remove it, any data source already in or added to the Available Data Sources list in the Select Data Source dialog box will remain there for future working sessions.

▶ **To remove a data source**

1. Select the data source you want to remove.
2. Choose the Remove button.

   Microsoft Query removes the data source from the list so that it's no longer available for querying. You can make it available again by choosing the Other button in the Select Data Source dialog box and reselecting the data source.

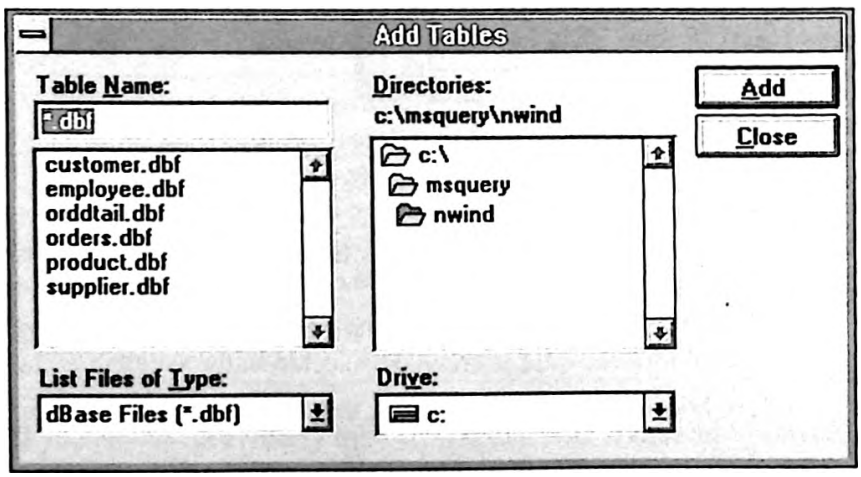
Note You can't remove a data source if any query that uses it is open. Close any open queries, and then remove the data source.

Adding Tables

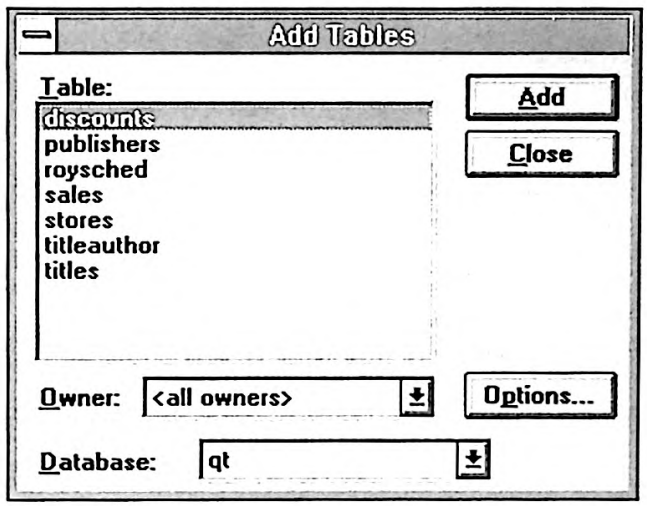
Once you've selected a data source, Microsoft Query displays the Query window with the Add Tables dialog box on top. You use this dialog box to select the tables containing the data you want to retrieve.

Applications for some data sources (such as SQL Server and Microsoft Access) use the term "table" for the place where they store data; other applications (such as Microsoft Excel and text-based applications) use the term "file." If your data is in a file, Microsoft Query uses the file as a table.

If your data is in a file, Microsoft Query for Windows displays the following Add Tables dialog box. (Microsoft Query for the Macintosh displays a comparable dialog box.)



If your data is in a table, Microsoft Query displays the following Add Tables dialog box instead. (Microsoft Query for the Macintosh displays a comparable dialog box.)



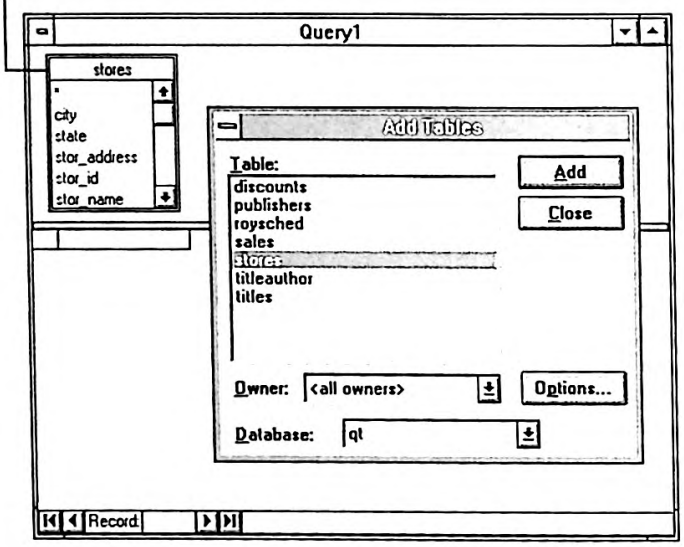
Note In this second dialog box, you can display in the Table list only those tables created by a particular owner by making a selection in the Owner box. You can display only those tables stored in a particular database by selecting that database in the Database box. (The Owner and Database boxes may have different labels depending on the data source.) Selecting the Options button displays an additional dialog box that you use to specify table options (which include displaying in the Table list the names of database tables, system tables, synonyms, and views) and to refresh the current list of tables. For more information about these items, search Help for "Add Tables command."

▶ To add a table to a query

1. In the Add Tables dialog box, double-click the table containing the data you want to include in your query (or select the table, and then choose the Add button).

   The table appears as a *field list* at the top of the Query window, behind the Add Tables dialog box.

The field list shows the fields in the table.

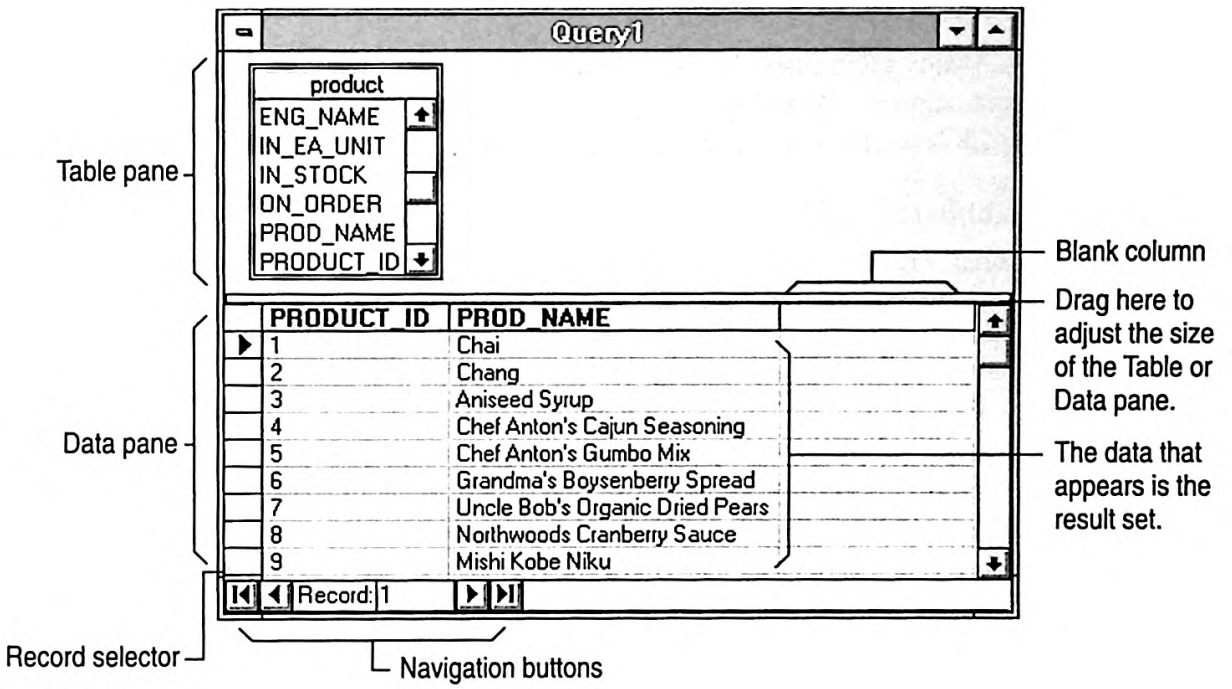


2. Choose the Close button.

Note You can add more than one table to a query, including tables from different databases. For more information, see Chapter 6, "Creating Multiple-Table Queries."

Understanding the Query Window

After you add tables and close the Add Tables dialog box, you'll see the Query window. You use this window to design, edit, and run your query.



The Query window is divided into *panes*. The *Table pane* displays the field list, which is an alphabetical list of fields in the table from which Microsoft Query will retrieve data. (This table is often referred to as the *underlying table*.) The *Data pane* displays data when you take fields from the field list and add them to the Data pane. The data that appears is called the *result set*, which Microsoft Query displays in columns and rows, similar to a spreadsheet.

Each field you add to the Data pane is shown as a column of data. The Data pane always displays a blank column to show you where to add the next field from the field list. Each row in the Data pane represents a record. You can move to a particular record by using the navigation buttons, and you can select a record by clicking its record selector. (For more information, see Chapter 3, "Working with Data.")

Note The Query window also includes a *Criteria pane*, which displays any criteria you specify to limit the data in the result set. For more information about displaying and using the Criteria pane, see Chapter 4, "Retrieving the Records You Want."

The status bar below the Query window (in the lower-left corner of the application window) provides helpful information as you design a query. When you're not sure what to do next, refer to the status bar for a quick clue.

▶ To hide the Table pane

You can hide the Table pane if you want more room for displaying the result set.

View Tables button

- Click the View Tables button on the toolbar. (The button will no longer look recessed.)

  -Or-

  From the View menu, choose Tables to remove the check mark.

You can show the Table pane by clicking the View Tables button again (or choosing Tables again).

▶ To resize a pane

- Drag the split bar that separates the two panes up or down.

▶ To delete a table from the Table pane

1. Click anywhere in the field list of the table you want to delete.
2. Press the DEL key.

   -Or-

   From the Table menu, choose Remove Table.

When you delete a table from the Table pane, you're not deleting the data in the underlying table. You're just removing the table's field list and data from the active query.

▶ To redisplay the Add Tables dialog box

Microsoft Query automatically displays the Add Tables dialog box when you create a query. If you close the dialog box, you can redisplay it to add more tables to the active query.

Add Tables button

- Click the Add Tables button on the toolbar.

  -Or-

  From the Table menu, choose Add Tables.

Choosing Fields

The purpose of a query is to retrieve data that answers your specific question. Although sometimes you might want to see all the data in an underlying table, many times you need only a subset of that data. With Microsoft Query, you can determine the data you'll see in the result set by selecting fields in the field list and adding them to the Data pane.

Note You can also limit a result set to a specific set of records by specifying criteria the records must meet to be displayed. For example, using the Northwind Traders data, you can tell Microsoft Query to display only those records from the Product table that have the value BEVR in the CATEGORY field. For more information, see Chapter 4, "Retrieving the Records You Want."

Adding Fields to the Data Pane

The Data pane contains a blank column to show you where to add a field from the field list. When you add a field, the blank column shifts to the right.

You can add fields one at a time, several at a time, or all at once, and you can use different techniques to add them to the Data pane. You can add a field from a field list, or you can add a field that displays the results of a calculation you define. For more information about adding the second type of field, see "Creating Your Own Expressions to Perform Calculations" in Chapter 5, "Performing Calculations on Data."

Note If you don't want Microsoft Query to automatically run the query every time you add a field or change your query, click the Automatic Query button or choose Automatic Query from the Records menu. If the Automatic Query option is turned off when you add fields to the Data pane, only the field names are displayed — not the data. (Automatic Query is off if the button isn't recessed or the command isn't checked.) When you're ready to run the query, click the Query Now button or choose Query Now from the Records menu.

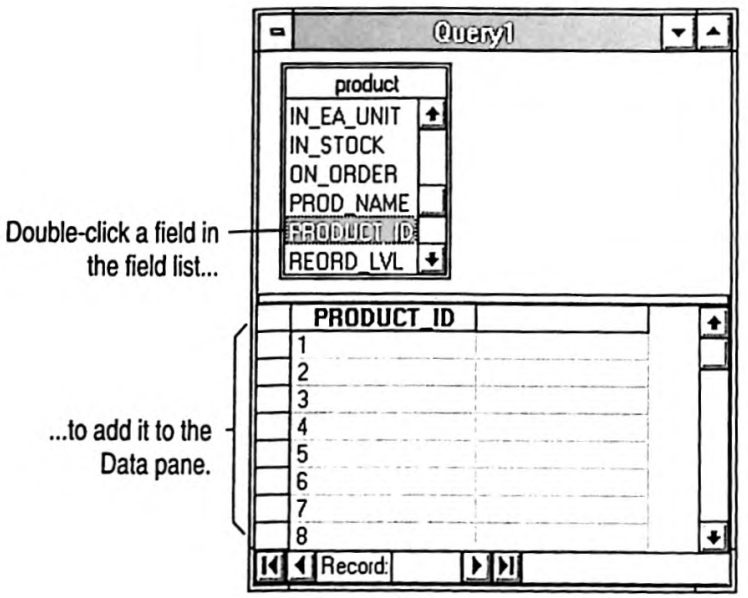
Automatic Query button

Query Now button

If the Automatic Query option is turned off and you choose Undo from the Edit menu, Microsoft Query reverts to the query design in effect the last time you ran the query.

▶ **To add a field to the Data pane**

- Double-click a field in the field list.



If the Automatic Query option is turned on, Microsoft Query automatically runs the query and displays the latest result set.

You can also add a field by:

- Dragging it from the field list to the blank column in the Data pane.
- Typing a field name in the blank column's heading box and then pressing ENTER.
- Clicking the drop-down arrow in the blank column's heading box and then selecting a field name. (Click the blank column's heading box to see its drop-down arrow.)
- Choosing Add Column from the Records menu and entering a field name in the Field box.

After you add the first field to the Data pane, each subsequent field is added to the end of the result set, unless you use the method for inserting fields.

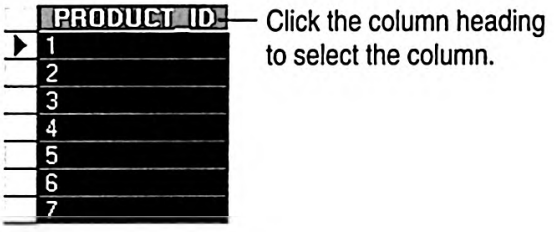
Inserting Fields

If you select a column in the result set, the Add Column command becomes Insert Column. By having a column selected when you add fields, you're telling Microsoft Query that you want to insert a new column to the left of the selected column instead of add a new column to the end of the result set.

▶ To select a field (column)

Each field you add to the Data pane has a column heading, which you use to select the field.

- Click the column heading.



-Or-

Move to the column and press CTRL+SPACEBAR in Microsoft Query for Windows or COMMAND+SPACEBAR in Microsoft Query for the Macintosh.

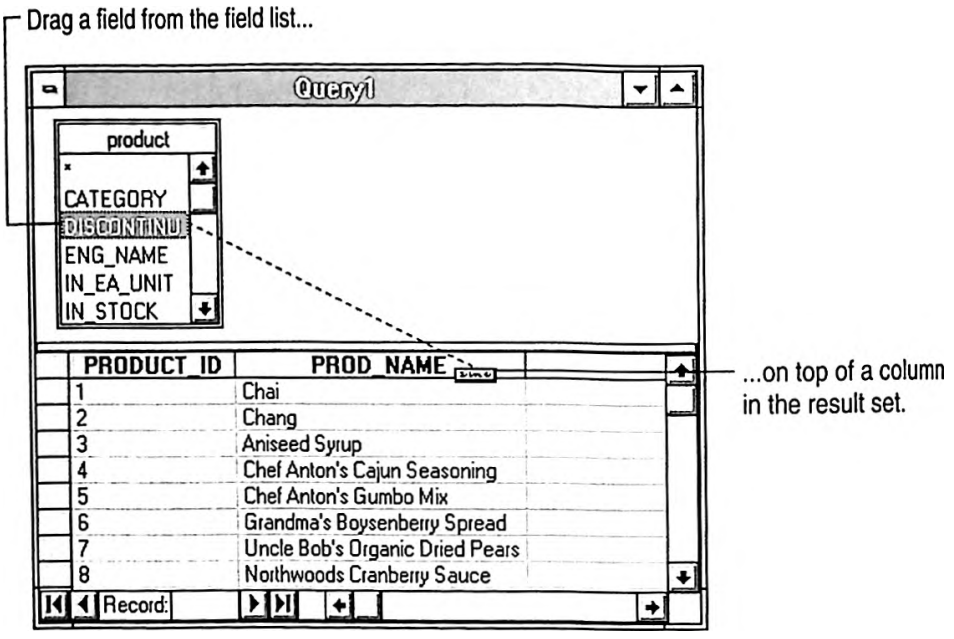
▶ To insert a field (column)

1. With a column selected, choose Insert Column from the Records menu.

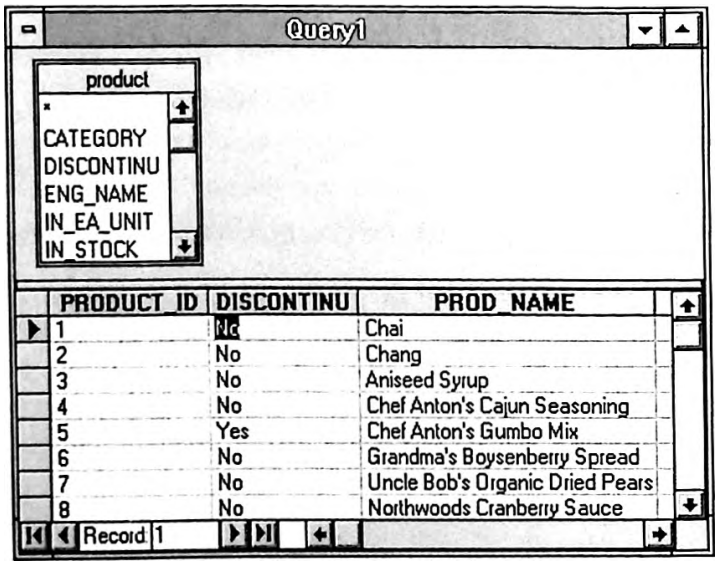
   Microsoft Query displays the Insert Column dialog box.
2. In the Field box, type a field name or select one in the drop-down list.
3. Choose the Insert button.

   Microsoft Query inserts the data from the field as a column to the left of the selected column.
4. Choose the Close button.

You can also insert a field by dragging it from the field list to the top of a column in the result set. The field is inserted to the left of the column.



The column underneath shifts to the right to make room for the new column.



▶ To add more than one field at a time

- Click the first field you want to add, then hold down the CTRL key in Microsoft Query for Windows or the CONTROL key in Microsoft Query for the Macintosh, and click the other fields. Drag them as a group to the Data pane.

  -Or-

  To select a block of fields, click the first field, then hold down the SHIFT key, and click the last field. Then drag the block to the Data pane.

Adding All Fields at Once

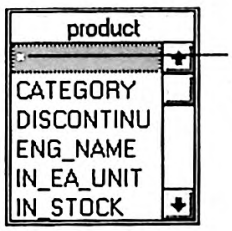
There are two ways to add all the fields from a field list to the Data pane at once: You can use the asterisk (*) in the field list, or you can drag all the fields as a group. The method you use determines the order in which columns are displayed in the Data pane.

Note If you create a query and add all the fields from the field list to the Data pane and later new fields are added to the underlying table, you have to add the new fields to the Data pane if you want them to be displayed in the result set.

▷ To add all fields in the order they were created

- Double-click the asterisk (or drag it from the top of the field list to the Data pane).

  Microsoft Query adds all the fields to the Data pane in the order they were created in the underlying table.



	PRODUCT_ID	SUPPLR_ID	CATEGORY	PROD_NAME	ENG_NAME	IN_EA_UNIT
	1	1	BEVR	Chai	Dharamsala Tea	4
	2	1	BEVR	Chang	Tibetan Barley Beer	3
	3	1	COND	Aniseed Syrup	Licorice Syrup	3
	4	2	COND	Chef Anton's Cajun Sea:	Chef Anton's Cajun Sea:	3
	5	2	COND	Chef Anton's Gumbo Mi:	Chef Anton's Gumbo Mi:	2
	6	3	COND	Grandma's Boysenberry	Grandma's Boysenberry	3
	7	3	PROD	Uncle Bob's Organic Dri	Uncle Bob's Organic Dri	1
	8	3	COND	Northwoods Cranberry S	Northwoods Cranberry S	1

...Microsoft Query adds the fields in the order they were created.

▶ To add all fields in alphabetical order

1. Double-click the field list's title bar to select all the fields in the list.
2. Click any of the selected fields in the field list, and drag the fields to the Data pane.

   Microsoft Query adds the fields to the Data pane in alphabetical order.

When you double-click the title bar and drag the fields...

	CATEGORY	DISCONTIN	ENG_NAME	IN_EA_UNIT	IN_STOCK	ON_ORD
▶	BEVR	No	Dharamsala Tea	4	39	0
	BEVR	No	Tibetan Barley Beer	3	17	40
	COND	No	Licorice Syrup	3	13	70
	COND	No	Chef Anton's Cajun Sea:	3	53	0
	COND	Yes	Chef Anton's Gumbo Mi	2	0	0
	COND	No	Grandma's Boysenberry	3	120	0
	PROD	No	Uncle Bob's Organic Dri	1	15	0
	COND	No	Northwoods Cranberry S	1	6	0

...Microsoft Query adds the fields in alphabetical order.

Tip If you want to add most but not all of the fields from the underlying table, double-click the field list's title bar. Then hold down the CTRL key in Microsoft Query for Windows or the CONTROL key in Microsoft Query for the Macintosh while you click the few fields you don't want to add. You can then drag the selected fields as a group to the Data pane.

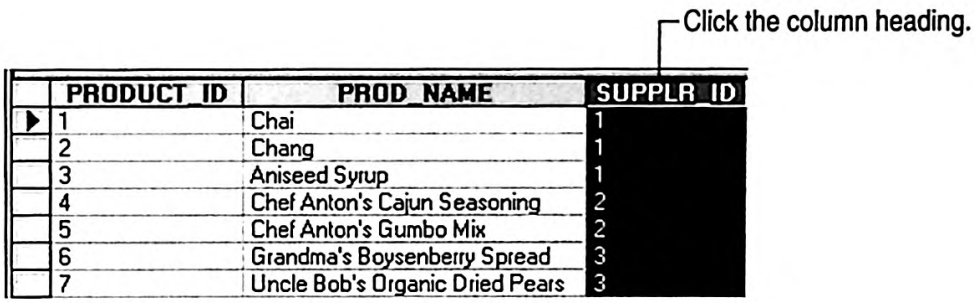
Deleting Fields

You can delete a field from the result set if you decide you don't want it. When you delete a field, you're not deleting the data from the underlying table — you're just removing that data from your query.

Caution If you delete a record (row) from the result set, you are deleting the data in that record from the underlying table. For more information, see Chapter 3, "Working with Data."

▶ To delete a field (column)

1. In the Data pane, select the field by clicking its column heading.



2. Press the DEL key.

   -Or-

   From the Records menu, choose Remove Column.

Note You can't delete the blank column from the Data pane.

▷ To delete a block of fields

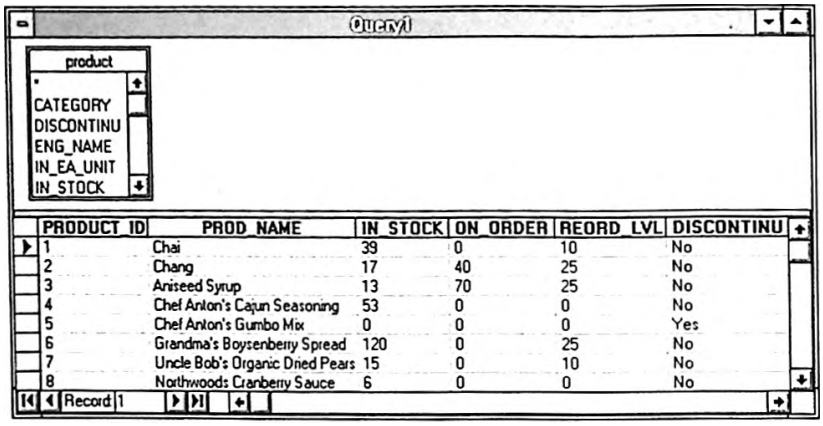
1. Click the column heading of the first field you want to delete.
2. Hold down the SHIFT key, and click the column heading of the last field you want to delete.
3. Press the DEL key (or choose Delete from the Edit menu).

Now You Create a Query

Suppose you've just become the stock clerk for Northwind Traders. One of your jobs is to monitor stock levels, making sure that the company has an adequate supply of every product. To do this, you can create a query that retrieves information about each product Northwind Traders sells.

Create a new query, selecting NWind as your data source. Add the Product table to the query, and then add the following fields to the Data pane: PRODUCT_ID, PROD_NAME, IN_STOCK, ON_ORDER, REORD_LVL, and DISCONTINU.

After you've designed the query, here's what your Query window should look like.



PRODUCT_ID	PROD_NAME	IN_STOCK	ON_ORDER	REORD_LVL	DISCONTINU
1	Chai	39	0	10	No
2	Chang	17	40	25	No
3	Aniseed Syrup	13	70	25	No
4	Chef Anton's Cajun Seasoning	53	0	0	No
5	Chef Anton's Gumbo Mix	0	0	0	Yes
6	Grandma's Boysenberry Spread	120	0	25	No
7	Uncle Bob's Organic Dried Pears	15	0	10	No
8	Northwoods Cranberry Sauce	6	0	0	No

Now you can compare the data in the IN_STOCK, ON_ORDER, REORD_LVL, and DISCONTINU fields to see if any stock needs to be ordered.

Saving a Query

After you've designed your query, you can save and reuse it later. If you use the following procedure, Microsoft Query saves the query design. The query design specifies which fields you want to retrieve and how you want to display them, but it doesn't include the data in the result set itself. If you save the design, the next time you execute your query, Microsoft Query will retrieve the most current data from the data source. If you want to save a query's result set as a new table, see Chapter 7, "Creating and Deleting Tables."

Save Query button

▶ **To save a query design**

1. Click the Save Query button on the toolbar.

   -Or-

   From the File menu, choose Save Query.

   When you save a query for the first time, Microsoft Query prompts you to name the query in the Save As dialog box.

2. Type a name, and choose the drive and directory or folder where you want to store the query file.

3. In Microsoft Query for Windows, choose the OK button.

   In Microsoft Query for the Macintosh, choose the Save button.

▶ **To save a copy of an existing query design under a new name**

1. From the File menu, choose Save As.

   Microsoft Query displays the Select Data Source dialog box.
2. Select QRY File, and then choose the Save button.
3. In the Save As dialog box, type a name and choose the drive and directory or folder where you want to store the query file.
4. In Microsoft Query for Windows, choose the OK button.

   In Microsoft Query for the Macintosh, choose the Save button.

Closing a Query

You can close a query when you no longer need it for the current working session.

▶ **To close a query**

1. From the File menu, choose Close Query.

   If you've made changes and haven't saved the query, Microsoft Query prompts you to save your changes. If you choose the Yes button but haven't previously named the query, the Save As dialog box is displayed.
2. Type a name, and choose the drive and directory or folder for your query.
3. In Microsoft Query for Windows, choose the OK button.

   In Microsoft Query for the Macintosh, choose the Save button.

Opening a Query

You open an existing query to view or edit the query design or the data the query retrieves.

▶ **To open a query**

Open Query button

1. Click the Open Query button on the toolbar.

   -Or-

   From the File menu, choose Open Query.

   Microsoft Query displays a list of queries in the current directory or folder.
2. In the Open Query dialog box, select the query you want to open.
3. In Microsoft Query for Windows, choose the OK button.

   In Microsoft Query for the Macintosh, choose the Open button.

Note Some data sources display an additional dialog box requesting more information, such as a user ID, password, database, and directory or folder. The dialog box you see varies depending on the data source you're using.

Microsoft Query opens the query in the Query window, displaying the tables in the Table pane and the result set in the Data pane (unless Automatic Query was off when you last saved this query).

Note You can have more than one query open at a time.

Quitting Microsoft Query

When you quit Microsoft Query, the application automatically closes any open Query windows.

▶ **To quit Microsoft Query**

- From the File menu, choose Exit in Microsoft Query for Windows or Quit in Microsoft Query for the Macintosh.

  If any open queries contain changes that you haven't saved, Microsoft Query prompts you to save your changes. Choose the Yes button if you want to save the changes.

If you initially started Microsoft Query from another application, the Exit or Quit command has a different name and there is an additional button on the toolbar. You can use the command or the button to quit Microsoft Query and insert the data from your query into the application you're using. For more information, see your application's documentation.

CHAPTER 2

Changing How Data Looks in the Data Pane

After you've added all the fields you need to the Data pane, you might decide to change how the data looks. For example, you might want to change the column order, sort the data in a field, or display the data in a different font. When you save your query, Microsoft Query saves the new layout for the next time you open your query.

In this chapter, you'll learn how to:

- Move columns.
- Change column width.
- Change row height.
- Hide and show columns.
- Sort data in columns.
- Change column headings.
- Change the display font.

Moving Columns

If you want to rearrange the columns in the Data pane, you can easily move them around until they're in the order you want. For example, you might want to position the column containing the names of your suppliers to the right of the Supplier ID column.

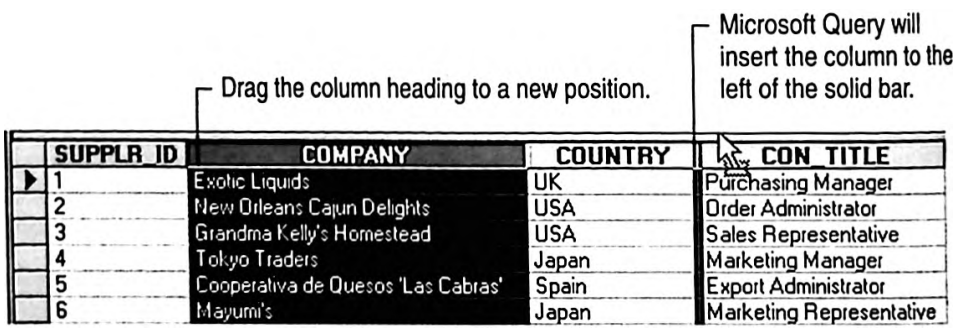
▶ To move a column by dragging

1. Select the column you want to move by clicking its column heading.

   To select a block of columns, select the first column in the block, then hold down the SHIFT key, and click the column heading of the last column in the block.

2. Click the column heading again, and drag the column to its new location.

   If you've selected multiple columns, you can click any of their column headings and then drag the entire group.



	SUPPLR_ID	COMPANY	COUNTRY	CON_TITLE
▶	1	Exotic Liquids	UK	Purchasing Manager
	2	New Orleans Cajun Delights	USA	Order Administrator
	3	Grandma Kelly's Homestead	USA	Sales Representative
	4	Tokyo Traders	Japan	Marketing Manager
	5	Cooperativa de Quesos 'Las Cabras'	Spain	Export Administrator
	6	Mayumi's	Japan	Marketing Representative

As you drag the column heading, a solid vertical bar appears to indicate where the column would move to if you released the mouse button. When you release it, Microsoft Query moves the column to the left of the bar.

	SUPPLR_ID	COUNTRY	COMPANY	CON_TITLE
	1	UK	Exotic Liquids	Purchasing Manager
	2	USA	New Orleans Cajun Delights	Order Administrator
	3	USA	Grandma Kelly's Homestead	Sales Representative
	4	Japan	Tokyo Traders	Marketing Manager
	5	Spain	Cooperativa de Quesos 'Las Cabras'	Export Administrator
	6	Japan	Mayumi's	Marketing Representative

Changing Column Width

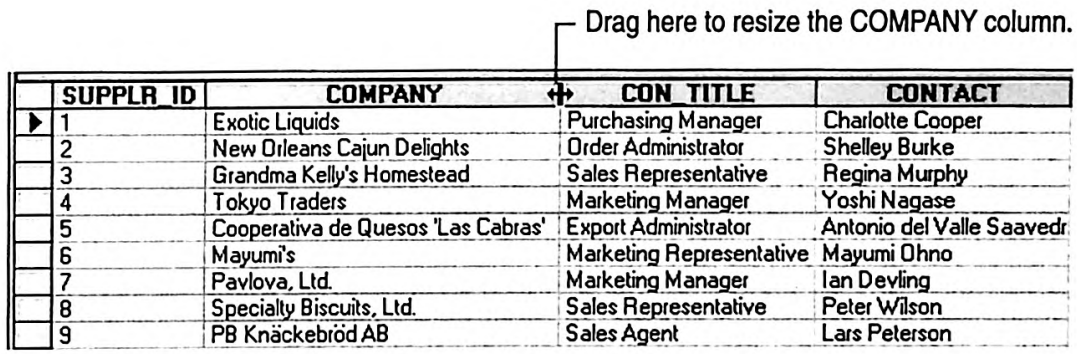
If a column in the Data pane is too wide or narrow for the values it contains, you can change its width. For example, a column might be too narrow to display long product names.

▶ To change the width of a column by dragging

1. Place the pointer over the right edge of the column heading for the column you want to resize.

   The pointer changes to a two-headed arrow.

2. Drag the column edge left or right until the column is the width you want.



	SUPPLR_ID	COMPANY	CON_TITLE	CONTACT
▶	1	Exotic Liquids	Purchasing Manager	Charlotte Cooper
	2	New Orleans Cajun Delights	Order Administrator	Shelley Burke
	3	Grandma Kelly's Homestead	Sales Representative	Regina Murphy
	4	Tokyo Traders	Marketing Manager	Yoshi Nagase
	5	Cooperativa de Quesos 'Las Cabras'	Export Administrator	Antonio del Valle Saavedr
	6	Mayumi's	Marketing Representative	Mayumi Ohno
	7	Pavlova, Ltd.	Marketing Manager	Ian Devling
	8	Specialty Biscuits, Ltd.	Sales Representative	Peter Wilson
	9	PB Knäckebröd AB	Sales Agent	Lars Peterson

▶ To change the width of a column using the Column Width dialog box

1. Click anywhere in the column whose width you want to change, and then choose Column Width from the Format menu.

   Microsoft Query displays the Column Width dialog box.

2. Type the number of characters you want the column to display based on the current font, and then choose the OK button.

   Microsoft Query may display more or fewer characters to compensate for uppercase letters or letters that aren't of average size for that font.

Note You can change a column back to the default width by selecting the Standard Width option.

▶ To change the width of several columns at once

1. Select the columns by dragging across their column headings.
2. Place the pointer over the right edge of the column heading for any of the selected columns.

   The pointer changes to a two-headed arrow.
3. Drag the column edge left or right until the column is the width you want.

   Microsoft Query adjusts all the selected columns to the same width.

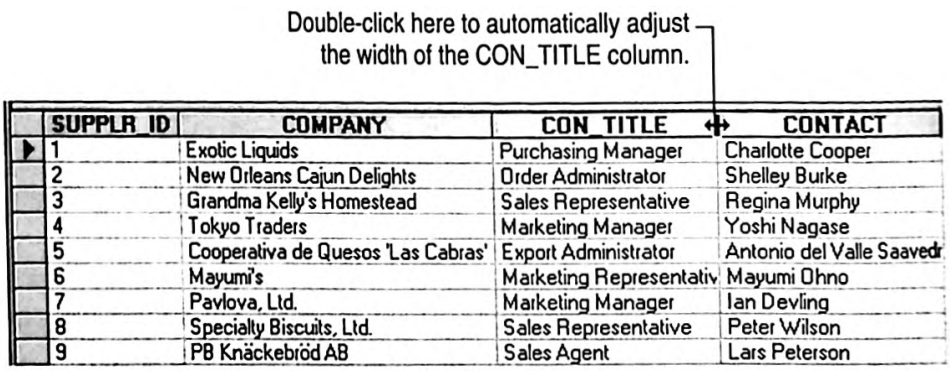
▶ To change the width of a column automatically

Microsoft Query can automatically adjust a column to fit the longest value displayed in the Data pane.

- Click anywhere in the column whose width you want to change, and then choose Column Width from the Format menu. In the Column Width dialog box, choose the Best Fit button.

  -Or-

  Double-click the right edge of the column heading.



SUPPLR_ID	COMPANY	CON_TITLE	CONTACT
1	Exotic Liquids	Purchasing Manager	Charlotte Cooper
2	New Orleans Cajun Delights	Order Administrator	Shelley Burke
3	Grandma Kelly's Homestead	Sales Representative	Regina Murphy
4	Tokyo Traders	Marketing Manager	Yoshi Nagase
5	Cooperativa de Quesos 'Las Cabras'	Export Administrator	Antonio del Valle Saavedr
6	Mayumi's	Marketing Representativ	Mayumi Ohno
7	Pavlova, Ltd.	Marketing Manager	Ian Devling
8	Specialty Biscuits, Ltd.	Sales Representative	Peter Wilson
9	PB Knäckebröd AB	Sales Agent	Lars Peterson

Note Microsoft Query adjusts the column width only for the data displayed on your screen, not all the data in the result set. This makes the query run faster, especially for large result sets. Consequently, if you scroll the contents of the Data pane or if you rerun the query and the data has changed, you may need to adjust the column width again.

Changing Row Height

If you want to see more or less data on the screen, you can change the height of all the rows in the result set. For example, you can increase row height and reduce column width so you can see more columns in the Data pane. When you increase row height, longer values wrap to subsequent lines in each row.

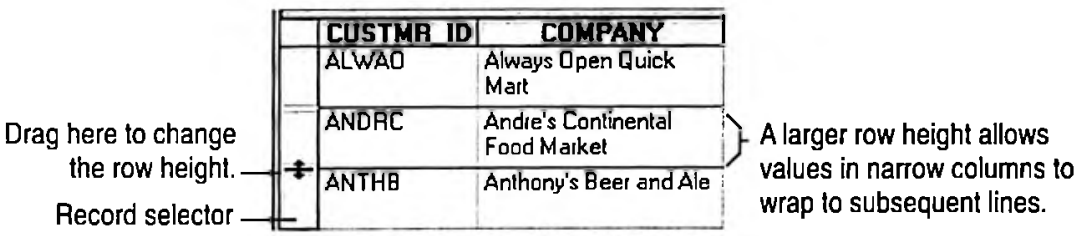
▶ To change row height by dragging

1. Position the pointer between any two record selectors at the left side of the Data pane.

   The pointer changes to a two-headed arrow.

2. Drag the row up or down to the desired height.

   All rows in the result set change to the new height.



▶ To change row height using the Row Height dialog box

1. From the Format menu, choose Row Height.

   Microsoft Query displays the Row Height dialog box.

2. Type a new row height in points (1 point equals 1/72 inch), and then choose the OK button.

   All the rows in the result set change to the height you specified. (You can change back to the default height by selecting the Standard Height option.)

Note If you use the Standard Height setting, the row height automatically adjusts to accommodate a new font size when you change the font Microsoft Query uses to display the result set. However, if you use a custom row height, you have to adjust it to fit the new font.

Hiding and Showing Columns

Sometimes you might want to temporarily hide a column from view but not delete it from the result set. For example, you might want to focus on the data in one particular column and hide the data in the columns on either side of it. With Microsoft Query, you can temporarily hide the columns you don't want to see and then show them again when you want to.

▶ To hide a column

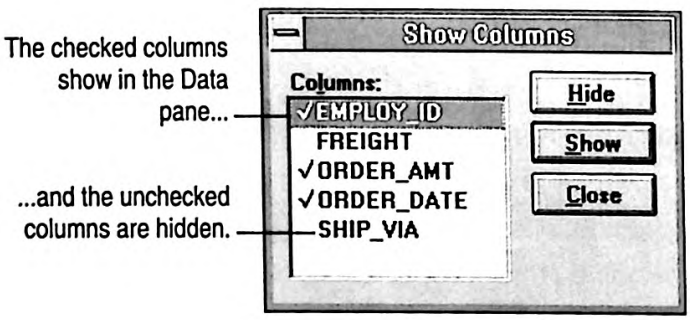
1. Click anywhere in the column you want to hide.
2. From the Format menu, choose Hide Columns.

   Microsoft Query hides the column.

▶ To show a column

1. From the Format menu, choose Show Columns.

   Microsoft Query displays the Show Columns dialog box. The Columns box lists all the columns in the result set.



2. Select the name of the column you want to show, and then choose the Show button.

   The column is redisplayed in the result set in its previous location.
3. When you've finished hiding and showing columns, choose the Close button.

Sorting Data in Columns

The task of analyzing data is often easier if records are displayed in alphabetic or numeric order. For example, you could sort a list of customers according to the city where they're located. The list of cities would be in alphabetical order.

COUNTRY	CUSTMR_ID	CITY
USA	RATTC	Albuquerque
USA	CACTP	Albuquerque
USA	CHEAC	Anacortes
USA	OLDWO	Anchorage
USA	GARCA	Auburn
USA	VALUF	Austin
USA	GOURG	Bellevue
USA	WANDW	Bellingham
USA	ANDRC	Bellingham
USA	FREDE	Bellingham

Records are sorted alphabetically by city.

In Microsoft Query, you can display data using different *sort orders*, which determine the order in which Microsoft Query displays records in the result set. You can sort records in ascending order (A–Z and 0–9) or descending order (Z–A and 9–0).

You can specify a sort order for more than one column. This means that values in one column can be sorted within groups of values in another column. Microsoft Query performs the sorts in the same order in which you applied them to the columns. For example, if you selected a sort order for the COUNTRY column first, then the CITY column, and finally the CUSTMR_ID column, Microsoft Query sorts on the COUNTRY column first, the CITY column second, and the CUSTMR_ID column third, as the following illustration shows.

Sorted first

Sorted second

Sorted third

COUNTRY	CUSTMR_ID	CITY
Canada	MERRG	East Vancouver
Canada	BOTTM	Tsawassen
Canada	HUNGO	Vancouver
Canada	LAUGB	Vancouver
UK	QUEEE	Harrogate
UK	BABUJ	London
UK	BSBEV	London
UK	EASTC	London
UK	EMPIT	London
UK	HANOP	London

Cities are sorted alphabetically for each country.

Note Changing the order of columns in the result set after you sort the records doesn't affect the sort order.

▶ To sort on one column using the Sort buttons

1. Click anywhere in the column you want to sort on.
2. Click the Sort Ascending or Sort Descending button on the toolbar.

   Microsoft Query sorts the values in the column in ascending or descending order.

Sort Ascending button

▶ To sort on additional columns using the Sort buttons

1. Click anywhere in the next column you want to sort.
2. Hold down the CTRL key in Microsoft Query for Windows or the COMMAND key in Microsoft Query for the Macintosh while you click the Sort Ascending or Sort Descending button.

   If you don't hold down the CTRL key or the COMMAND key, Microsoft Query removes any previous sorts you've defined for the query.

   Microsoft Query performs the sorts in the same order in which you apply the sorts to the columns. (The values in each additional column are sorted within the previous columns you sorted on.)

Sort Descending button

▶ To sort on multiple columns at the same time using the Sort buttons

1. Arrange the columns in the order you want the sorts performed from left to right in the Data pane.

   For example, if you want city names to be sorted before country names, place the CITY column to the left of the COUNTRY column.
2. Select the columns you want to sort on by dragging across their column headings.
3. Click the Sort Ascending or Sort Descending button on the toolbar.

   Microsoft Query sorts on the columns in left-to-right order.

▶ To sort on columns using the Sort dialog box

1. From the Records menu, choose Sort.

   Microsoft Query displays the Sort dialog box. The Column list box lists all unsorted columns in the result set.

2. In the Column list, select the column you want to sort on.

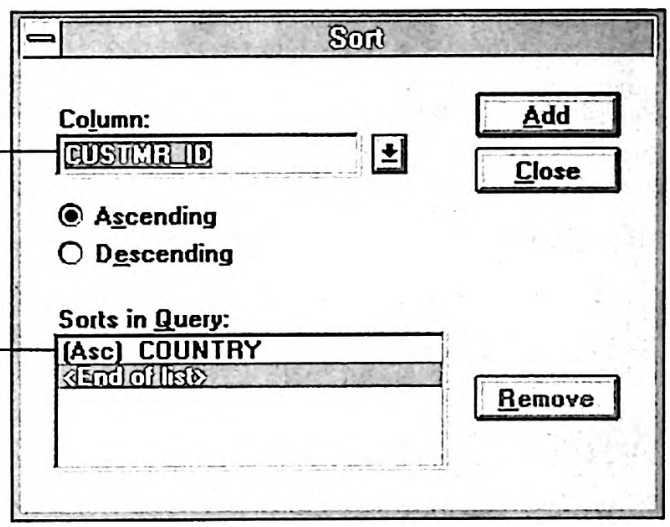
   -Or-

   If you want to sort records using the values in a field that isn't included in the result set, type the name of that field in the Column box.

3. Select the Ascending or Descending option, and then choose the Add button.

   Microsoft Query sorts the values in the column.

   Once you add a sort for a column, Microsoft Query removes the column from the Column list box and places it in the Sorts In Query box.



   Repeat Steps 2 and 3 for each additional column you want to sort on. The Sorts In Query box lists the sorted columns in the order in which Microsoft Query performs the sorts.

4. Choose the Close button.

▶ To remove a sort order

1. From the Records menu, choose Sort.

   Microsoft Query displays the Sort dialog box.

2. In the Sorts In Query box, select the column whose sort order you want to remove, and then choose the Remove button.

   The values in the column return to the order they were in before you sorted the column.

   After you remove a column from the Sorts In Query box, the column name is redisplayed in the Column list box.

▶ To change the order of multiple sorts

If you sorted on multiple columns using the Sort buttons but want to change the order of the sorts, use the Sort dialog box.

1. From the Records menu, choose Sort.

   Microsoft Query displays the Sort dialog box.

2. In the Sorts In Query box, select the column that's in the wrong order, and choose the Remove button.

   Microsoft Query removes the column from the Sorts In Query box and adds it to the Column list box.

3. In the Sorts In Query box, select the column that you want to sort on after the column you've just removed is re-sorted.

4. In the Column list box, select the column you removed from the Sorts In Query box in Step 2.

5. Select the Ascending or Descending option, and then choose the Add button.

   Microsoft Query adds the column to the Sorts In Query box immediately above the selected column. In the result set, the values are re-sorted.

Changing Column Headings

If you don't want to use the field names from the underlying table as your column headings, you can give columns new headings that are more useful or meaningful. For example, you could change the heading "SLS_DATA" to a more descriptive heading, such as "Sales Data 1993." The new column heading doesn't replace the one in the underlying table; it appears only in the query's result set.

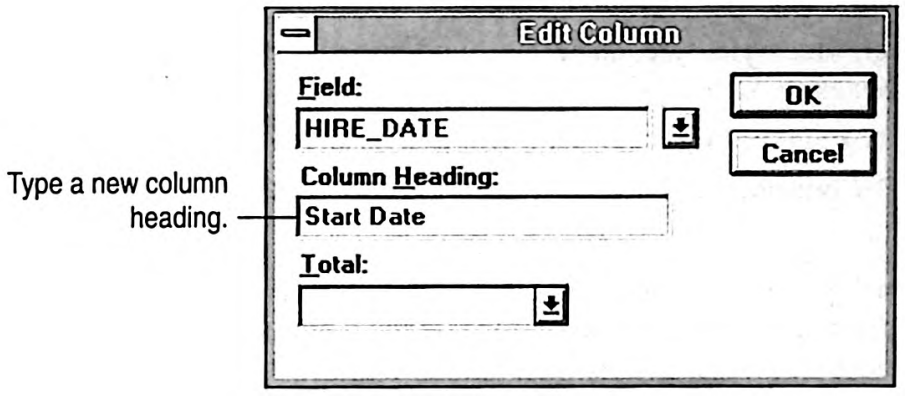
▶ To change a column heading

1. Double-click the column heading you want to change.

   -Or-

   Click anywhere in the column, and then choose Edit Column from the Records menu.

Microsoft Query displays the Edit Column dialog box with the name of the current column selected in the Field box.



2. In the Column Heading box, type a new column heading.
3. Choose the OK button.

   Microsoft Query displays the new column heading in the result set.

Changing the Display Font

You can display the data in your result set in any of the fonts available on your computer. When you change the font, you change it for the entire result set, not for individual cells, rows, or columns.

When you change the font...

	CATEGORY	PROD_NAME	UNIT_PRICE
	BEVR	Chai	18
	BEVR	Chang	19
	COND	Aniseed Syrup	10
	COND	Chef Anton's Cajun Seasoning	22
	COND	Chef Anton's Gumbo Mix	21.35
	COND	Grandma's Boysenberry Spread	25
	PROD	Uncle Bob's Organic Dried Pears	30
	COND		
	MEAT		

	CATEGORY	*PROD_NAME*	*UNIT_PRICE*
	BEVR	*Chai*	*18*
	BEVR	*Chang*	*19*
	COND	*Aniseed Syrup*	*10*
	COND	*Chef Anton's Cajun Seasoning*	*22*
	COND	*Chef Anton's Gumbo Mix*	*21.35*

...you change it for the entire result set.

▶ To change the display font

1. From the Format menu, choose Font.

   Microsoft Query displays the Font dialog box.

2. Select the font, font style, size, and effect (underlined) you want in the appropriate boxes.

   The Sample box shows how your data will look based on your selections.

3. Choose the OK button.

Note If you're using the Standard Height setting for row height, Microsoft Query automatically adjusts row height to accommodate the new font size. However, if you're using a custom row height, you have to adjust it to fit the new font.

CHAPTER 3

Working with Data

With Microsoft Query, you can do more than just look at your data. If the data in your query comes from only one table and your data source allows you to modify data, you can use Microsoft Query to make changes to the data in the underlying table. For example, if your query retrieves data from a dBASE file, you can use Microsoft Query to add new data to the file or delete existing data. You can also copy data from one location to another in the Query window or from Microsoft Query to another application (such as Microsoft Word).

In this chapter, you'll learn how to:

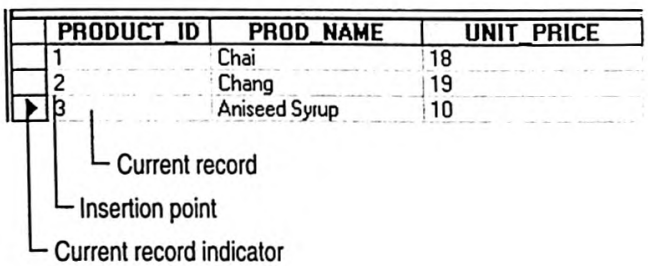
- Move between fields and records.
- Change your data.
- Copy data from one place to another.

Moving Between Fields and Records

Before you can change data, you have to move to the field or record in the Data pane that contains the data you want to change. Microsoft Query provides several ways you can move between fields and records.

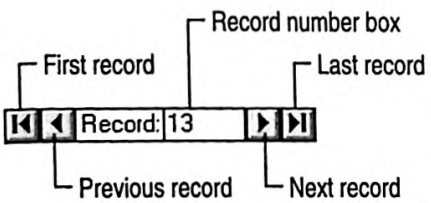
Moving to Another Record

If you can see the record you want to move to in the Data pane, you can simply click any cell in that record to make it the *current record*. The current record contains the insertion point and has an arrow-shaped indicator in its record selector.



Using the Mouse

If you want to move quickly from record to record using the mouse, you can click the navigation buttons in the lower-left corner of the Query window. If you know the number of the record you want to move to, you can use the record number box.



▶ **To move to a specific record**

1. Click the number in the record number box to select it (or press F5).
2. Type the number of the record you want to move to, and then press ENTER.

Note You can also move directly to a specific record by choosing Go To from the Records menu, typing the number of the record you want to move to, and then choosing the OK button.

Using the Keyboard

If you prefer to use the keyboard, you can do so. The following table lists keyboard techniques for moving between records and navigating in the Query window.

To	Do this
Move to the next or previous record	Press DOWN ARROW or UP ARROW.
Move to the first field (column) of the first record or the last field of the last record	In Microsoft Query for Windows, press CTRL+HOME or CTRL+END. In Microsoft Query for the Macintosh, press CONTROL+HOME or CONTROL+END.
Move to the next pane	Press F6.
Move to the previous pane	Press SHIFT+F6.
Scroll up or down one page in the Data pane	Press PAGE UP or PAGE DOWN.

Moving to Another Field

If you see the field (column) you want to move to in the Data pane, you can simply click anywhere in the field to move to it. If you prefer using the keyboard, you can use the following keyboard techniques for moving between fields.

To	Do this
Move to the next field (column)	Press TAB, RIGHT ARROW, or ENTER.
Move to the previous field (column)	Press SHIFT+TAB or LEFT ARROW.
Move to the first field (column) of the current record	Press HOME.
Move to the last field (column) of the current record	Press END.

Changing Your Data

When you change the data in a query's result set, you're changing the data in the underlying table. For example, if your query retrieves data from a Paradox file, when you change the data in the result set, you're changing the Paradox data.

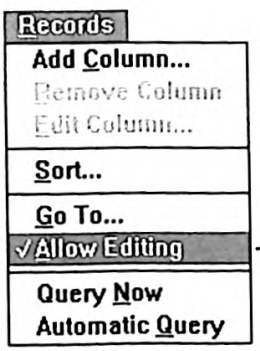
Allowing Changes

Microsoft Query protects your data by preventing changes to it unless you specify that changes are allowed. This safeguard helps you keep your data accurate. Before you can add, edit, or delete data, you must tell Microsoft Query to accept changes to the data.

Note You can make changes to data only if the data in your query comes from a single table and your data source allows you to modify data.

▶ **To allow changes to your data**

- From the Records menu, choose Allow Editing.



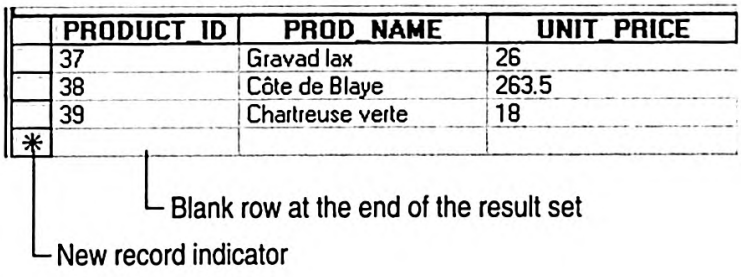
—The option is turned on when a check mark is displayed.

Important Usually, when you change a record, Microsoft Query changes all matching records in the result set. For example, if you have three identical records in the result set and you delete one, Microsoft Query deletes the other two records as well.

For this reason, it's a good idea to add all of a table's fields to the Data pane before you make changes to your data. This prevents you from accidentally changing data in records that have some matching fields. If some of the table's fields are missing from the Data pane, you can add them by double-clicking the field names in the table's field list. (For more information on adding fields, see "Choosing Fields" in Chapter 1, "Getting Started with Queries.")

Adding Records

When you turn on the Allow Editing option, Microsoft Query adds a blank row to the end of the result set. This row has an asterisk (*) in its record selector.



▶ **To add a new record**

1. Add the fields to the Data pane.
2. If you haven't already done so, choose Allow Editing from the Records menu to tell Microsoft Query to accept changes to your data.
3. Move to the first field (column) in the blank row.
4. Type a value, and then press TAB to move to the next field.
5. When you've finished entering values in the fields in the new record, press TAB to move to the next blank row.

   Microsoft Query saves the record in the underlying table.

Why Can't I Enter the Value I Want?

If the data in your query comes from a database, the database may restrict the values you can enter into a field. When you try to move out of a field after entering data, Microsoft Query checks to make sure that the value you've entered is permitted in that field. Microsoft Query won't accept a value if:

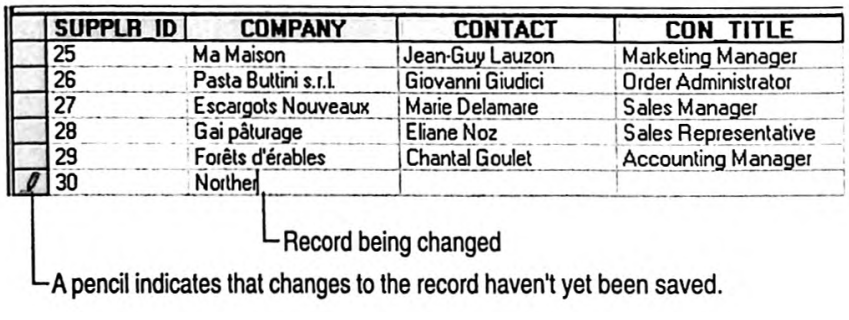
- The value is the wrong type of data. For example, you can't enter text into a field that stores only numbers.
- The value is too large for the field. For example, you can't enter 10 characters into a field that can store a maximum of 5 characters.
- The value breaks a rule defined in your database. For example, the rule may prohibit numbers greater than 100.

If you try to enter an unacceptable value, Microsoft Query displays a message explaining why it can't accept the value. Cancel your entry, and type a new value.

Saving Data

When you leave a record or close your query, Microsoft Query automatically saves the data in the underlying table. You don't have to do anything else to save the data.

While you're adding or editing a record, a pencil appears in its record selector. The pencil indicates that your changes haven't yet been saved.



When you leave the record, Microsoft Query saves your changes, and the pencil disappears.

Selecting Data

Before you can replace, copy, move, or delete data in the result set, you must select it. You can select:

- Data within a cell (the intersection of a row and column in the Data pane).
- One or more records (rows).
- One or more fields (columns).

Using the Mouse

The following table lists techniques for selecting data using the mouse.

To select	Do this
Part of the data within a cell	Double-click the cell, and then hold down the mouse button and drag across the data you want to select.
The entire contents of a cell	Click the cell.
A single record (row)	Click the record selector to the left of the record.
More than one record (row)	Click the record selector of the first record and drag to the last record.
A single field (column)	Click the column heading.
More than one field (column)	Click the column heading of the first field and drag to the column heading of the last field.
All the data in the result set	Click the record selector in the upper-left corner of the Data pane.

Using the Keyboard

The following table lists techniques for selecting data using the keyboard.

To select	Do this
Part of the data in a cell	Move the insertion point to where you want to start selecting, then hold down the SHIFT key, and use the LEFT or RIGHT ARROW key to move to the end of the selection.
The entire contents of a cell	Press F2. (To cancel the selection, press F2 again.)
The current record (row)	Press SHIFT+SPACEBAR.

To select	Do this
More than one record (row)	Press SHIFT+SPACEBAR, and then press SHIFT+UP ARROW or SHIFT+DOWN ARROW.
A single field (column)	In Microsoft Query for Windows, press CTRL+SPACEBAR. In Microsoft Query for the Macintosh, press COMMAND+SPACEBAR.
More than one field (column)	Press CTRL+SPACEBAR in Microsoft Query for Windows or COMMAND+SPACEBAR in Microsoft Query for the Macintosh, and then press SHIFT+UP ARROW or SHIFT+DOWN ARROW.
All the data in the result set	In Microsoft Query for Windows, press CTRL+SHIFT+SPACEBAR. In Microsoft Query for the Macintosh, press COMMAND+SHIFT+SPACEBAR.

Editing Data in the Result Set

You can edit the data in a cell in the result set by replacing all or part of its value or by inserting new data without replacing the existing value. You can also delete all or part of the data in a cell, or one or more records.

Changing Data in a Cell

You can change all or part of the data in a cell.

▶ **To replace the value in a cell**

1. Select the data you want to replace.
2. Type your changes.

▶ **To insert a value in a cell**

1. Double-click where you want to begin inserting.

   -Or-

   Move to the cell using the TAB key, then press F2, and use the LEFT OR RIGHT ARROW key to move the insertion point to where you want to begin inserting new data.
2. Type the data you want to insert.

Tip If you need more room to type your changes, choose Zoom Field from the View menu. (In Microsoft Query for Windows, you can also double-click the right mouse button.) Microsoft Query displays the cell's contents in an expanded text box. You can type your changes directly in the text box. When you've finished making changes, choose the OK button to enter your changes into the field, or choose the Cancel button to cancel your changes.

When you leave a record, Microsoft Query automatically saves your data. You don't have to do anything else to save it.

Deleting Data in a Cell

You can select and delete all or part of the data in a cell.

Warning When you delete data in a cell in the result set, you're deleting data in the query's underlying table.

▶ **To delete data in a cell**

1. If you haven't already done so, turn on the Allow Editing option by choosing Allow Editing from the Records menu.

   The option is turned on when a check mark is displayed next to the command on the menu.

2. Select the data you want to delete.
3. From the Edit menu, choose Delete.

   –Or–

   Press the DEL key.

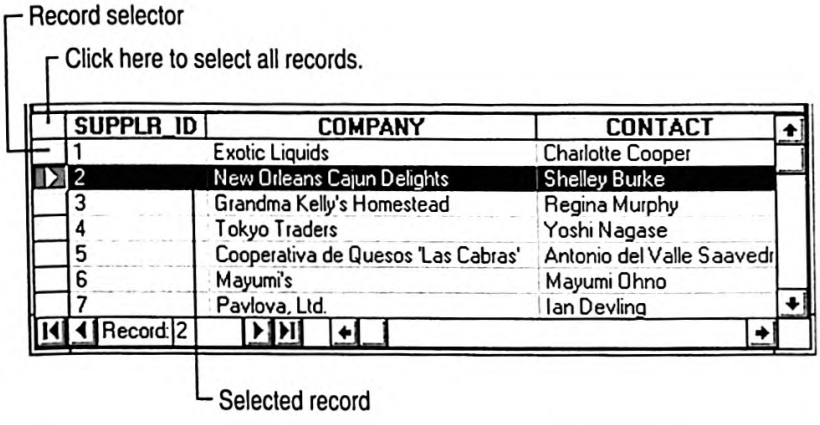
   Microsoft Query deletes the selection.

Immediately after you delete data in a cell, you can undo your deletion by pressing the ESC key in Microsoft Query for Windows or COMMAND+PERIOD in Microsoft Query for the Macintosh.

Deleting One or More Records

You can select and delete one or more records you no longer want.

You select a record by clicking its record selector or pressing SHIFT+SPACEBAR. You can select all the records in the result set by clicking the record selector in the upper-left corner of the Data pane.


Record selector
Click here to select all records.
SUPPLR_ID
COMPANY
CONTACT
1 Exotic Liquids Charlotte Cooper
2 New Orleans Cajun Delights Shelley Burke
3 Grandma Kelly's Homestead Regina Murphy
4 Tokyo Traders Yoshi Nagase
5 Cooperativa de Quesos 'Las Cabras' Antonio del Valle Saavedr
6 Mayumi's Mayumi Ohno
7 Pavlova, Ltd. Ian Devling
Record: 2
Selected record

Warning When you delete records in the result set, you're deleting data in the query's underlying table. You can't undo the deletion.

▶ To delete one or more records

1. If you haven't already done so, turn on the Allow Editing option by choosing Allow Editing from the Records menu.

   The option is turned on when a check mark is displayed next to the command on the menu.

2. Select the record or records you want to delete.
3. From the Edit menu, choose Delete.

   –Or–

   Press the DEL key.

   Microsoft Query displays a message asking you to confirm your deletion.

4. Choose the OK button to delete the record or records.

   Microsoft Query deletes the record or records from the result set and from the underlying table.

Why Can't I Change or Delete the Data I Want?

If you can't change or delete the data you want, check to make sure that:

- You have turned on the Allow Editing option. (Choose Allow Editing from the Records menu. The option is turned on when a check mark is displayed next to the command.)
- Your data source allows you to make changes to data. Some data sources (such as those based on the Microsoft Excel driver that comes with Microsoft Query) don't allow you to use Microsoft Query to change your data. For more information, see your application's documentation.

In any case, there are certain kinds of data you can't change or delete, including:

- **Data in queries that have more than one table** If the data in your query comes from more than one file or table, you can't edit or delete the data in the result set.
- **Data in calculated fields** If a field in your query performs a calculation, such as Price*Quantity, you can't delete the result of the calculation or modify it directly.
- **Data in fields that are locked or disabled** If the data in your query comes from a database, the database may prevent you from changing or deleting the value in a field by locking or disabling the field.
- **Data in locked records** If you use Microsoft Query in a multiuser environment and a record is locked (currently being used) by another user, you can't edit or delete the data in the record.
- **Data in queries that calculate totals** If your query calculates a total, such as the average price or the sum of all units on hand, you can't edit or delete the data in the query's result set.

Another reason why you might not be able to delete data from a field is that the table on which the query is based may require that the field always have a value; that is, it can never be empty.

In addition, you may not be able to make changes to data in fields that can contain only a certain type of data. If the data in your query comes from a database, the database may impose restrictions on the value in a field. For example, the database may stipulate that a field can contain only values supplied by the database itself. A field that contains order numbers, for example, may be restricted to order numbers assigned by the database.

Undoing Changes

What if you make a mistake or change your mind? You can undo the most recent change to your query's design. You can also undo the most recent edit to a field or all your editing changes to the current record, provided you don't begin editing another record or switch to another window.

The Edit menu displays the Undo command for your most recent change. The following table lists all the Undo commands and explains what each does.

This Undo command	Does this
Undo Add Table	Removes the last table you added to your query.
Undo Remove Table	Re-adds the last table you removed from your query.
Undo Add Column	Removes the last field (column) you added to the Data pane. If you added all the fields from a table in a single operation, this command removes all the columns from the Data pane.
Undo Delete Column	Re-adds the last field (column) or fields you deleted from the Data pane.
Undo Criteria Edit	Reverses your last change to a cell in the Criteria pane.
Undo Remove Criteria	Re-adds the last criteria you removed from the Criteria pane.
Undo Add Join	Removes the last table join you added.
Undo Remove Join	Re-adds the last table join you removed.
Undo Add Sort	Removes the last sort you added.
Undo Remove Sort	Re-adds the last sort you removed.
Undo Current Record	Reverses your changes to the current record.

For more information on these commands, search Help for "Undo command."

▶ **To undo your most recent change**

- From the Edit menu, choose the available Undo command.

You can undo your most recent changes to a field or record only before you move to another record or switch to another window. You can move to the Table pane or the Criteria pane, though, and still return to the last record you edited and undo

your changes. However, once you switch to another window or move to another record, your changes become permanent.

▶ **To undo your most recent changes to a cell**

- In Microsoft Query for Windows, press the ESC key.

  In Microsoft Query for the Macintosh, press COMMAND+PERIOD.

▶ **To undo all changes to the current record**

- From the Edit menu, choose Undo Current Record.

  -Or-

  In Microsoft Query for Windows, press the ESC key twice.

  In Microsoft Query for the Macintosh, press COMMAND+PERIOD twice.

Copying or Moving Data

You can save time and avoid typing errors by copying or moving data from one place to another. With Microsoft Query, you can:

- Copy or move data from one cell to another.
- Copy data from Microsoft Query to another application.

Copying or Moving Data from One Cell to Another

You can copy or move data from one cell in the Data pane to another. You can also copy or move data from a cell in the Data pane to a cell in the Criteria pane (or vice versa).

▶ **To copy or move data from one cell to another**

1. Select the data you want to copy or move.
2. From the Edit menu, choose Copy to copy data or Cut to move data.

   Microsoft Query places the data you selected onto the Clipboard.
3. Move to the cell where you want to place the selected data. If you want to replace the current value of the cell, select the whole value. If you want to add the copied or cut data to existing data, position the insertion point where you want to begin inserting.
4. From the Edit menu, choose Paste.

   Microsoft Query pastes the data into the cell.

Copying Data to Another Application

You can copy data from Microsoft Query to another application, such as Microsoft Excel. The method you use to paste the data determines whether the data is static or dynamic.

Static data never changes, regardless of changes you make to the original data. For example, if you copy data from Microsoft Query to a Microsoft Excel worksheet and then change the original data in Microsoft Query, your changes aren't reflected in the worksheet. The original and the copied data are not linked or connected. You have simply taken a snapshot of the data in Microsoft Query and pasted it into the worksheet. The data behaves exactly as if you had typed it directly into the Microsoft Excel worksheet.

Dynamic data, in contrast, does reflect changes you make to the original data. For example, if you copy data from Microsoft Query to a Microsoft Excel worksheet and then change the original data in Microsoft Query, the data in the worksheet changes. This happens because it is linked to the original data, and the copied data is updated dynamically to reflect changes to the original data. The update occurs each time you open the Microsoft Excel worksheet containing the copied data. The link between the original data and the copied data guarantees that your Microsoft Excel worksheet always contains up-to-date data, provided you run your query first to retrieve the most current data.

Note In Microsoft Query for the Macintosh, you can paste data dynamically only if you're using Macintosh System 7™ or later.

▶ **To copy data to another application**

1. In the result set, select the data you want to copy.
2. From the Edit menu, choose Copy.

   -Or-

   If you want to include column headings and row numbers with your data, choose Copy Special from the Edit menu. In the Copy Special dialog box, select the options you want, and then choose the OK button.
3. Start the other application, and open the file into which you want to paste the data.
4. Select the upper-left corner of the area where you want to paste the data.

5. If you want the data to remain static, choose Paste from the Edit menu in the other application.

   –Or–

   If you want the data to change dynamically, choose Paste Link (or its equivalent) from the Edit menu in the other application.

Note Some applications may use a different Paste command for pasting dynamic data. Check the Paste commands in your application to determine which one to use.

If you paste data using the Paste command, the other application simply pastes the data. If you paste data using the Paste Link command, the other application pastes the data and creates a link between the copied data and the original data. Each time you open the file containing the copied data, you'll have the chance to re-establish the link and update the copied data to reflect changes to the original data.

CHAPTER 4

Retrieving the Records You Want

How do you narrow down a query's result set to just the data you want to see? You may want to see only orders over a certain amount, or only products within a certain category. You may not be interested in seeing *all* suppliers—only the ones from France.

In this chapter, you'll learn how to focus on just the data you want.

	COMPANY	COUNTRY
	Exotic Liquids	UK
	New Orleans Cajun Delights	USA
	Grandma Kelly's Homestead	USA
	Tokyo Traders	Japan
	Cooperativa de Quesos 'Las Cabras'	Spain
	Mayumi's	Japan
	Pavlova, Ltd.	Australia
	Specialty Biscuits, Ltd.	UK
	PB Knäckebröd AB	Sweden
	Refrescos Americanas LTDA	Brazil
	Heli Süßwaren GmbH & Co. KG	Germany
	Plusspar Lebensmittelgroßmärkte AG	Germany
	Nord-Ost-Fisch Handelsgesellschaft m	Germany
	Formaggi Fortini s.r.l.	Italy
	Norske Meierier	Norway
	Bigfoot Breweries	USA
	Svensk Sjöföda AB	Sweden
	Aux joyeux ecclésiastiques	France

Instead of seeing all suppliers...

	COMPANY	COUNTRY
	Aux joyeux ecclésiastiques	France
	Escargots Nouveaux	France
	Gai pâturage	France

...you can focus on the suppliers from France.

Specifying Criteria

With Microsoft Query, you retrieve a subset of records by specifying *criteria*. For example, if you want to view only the suppliers from France, your criterion is "Country is France." Microsoft Query uses your criteria to retrieve the records you want and display them in the Data pane.

You can specify criteria to retrieve records:

- That fall into a certain range, such as records for employees with start dates between 1-Jan-91 and 1-Jan-92.
- Whose values contain, begin, or end with characters you specify, such as records for all customers whose names start with the letter B.
- That meet multiple criteria, such as records for suppliers who provide seafood products and who are from Singapore or Japan.
- That don't match a value, such as records for suppliers who are not located in Canada.
- That are missing values, such as employee records that don't include a birthdate.
- That contain one of several values, such as records for suppliers that are located in France, Germany, or Japan.
- That contain values based on a calculation, such as price multiplied by quantity.

You can specify criteria in three ways: using the Add Criteria button, using the Add Criteria dialog box, or using the Criteria pane.

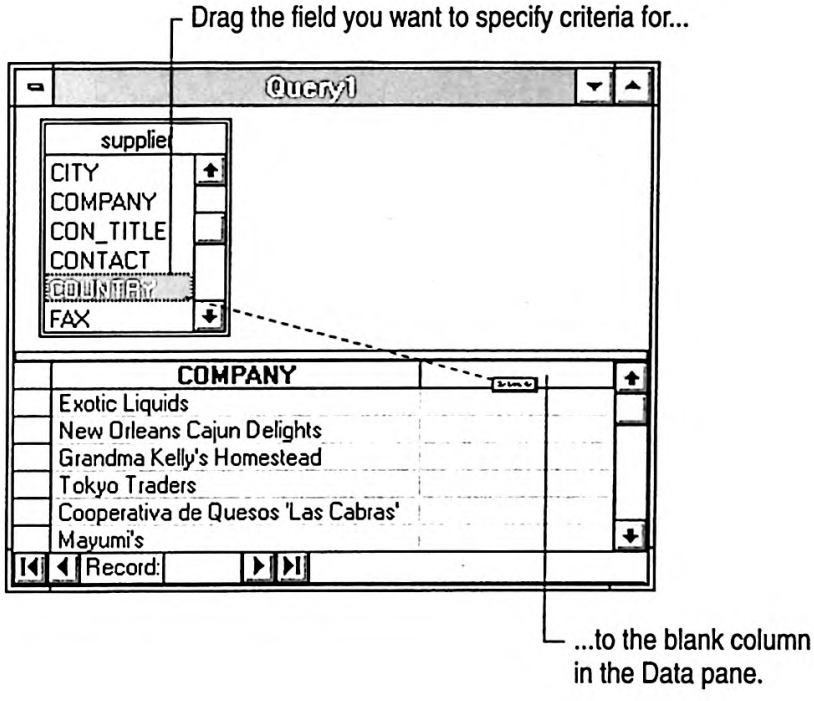
Using the Add Criteria Button to Specify Criteria

Using the Add Criteria button is the simplest way to retrieve records that have matching values in one or more fields. For example, you can retrieve all the records that have London in the CITY field and Ontario in the REGION field.

▷ To retrieve records with matching values using the Add Criteria button

1. Add the field you want to specify criteria for by dragging it to the Data pane.

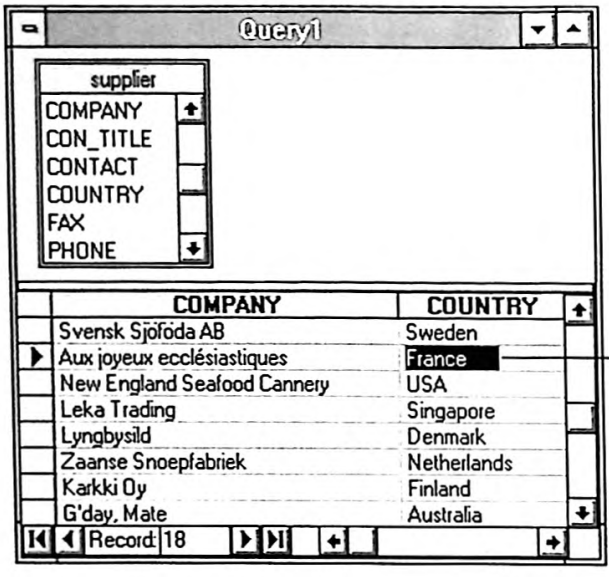
   For example, if your criterion is "Country is France," drag the COUNTRY field to the Data pane.



   If the Automatic Query option is turned on, Microsoft Query displays the field's data in a column in the result set.

2. In the result set, click a cell that contains the value you want to use for the criterion.

   For example, if your criterion is "Country is France," click any cell in the COUNTRY column that contains France.



Add Criteria button

3. Click the Add Criteria button on the toolbar.

   If this is the first time you've specified criteria for this query since you created or opened it, Microsoft Query automatically displays the Criteria pane. If the Criteria pane isn't displayed, you can click the View Criteria button on the toolbar (or choose Criteria from the View menu) to see the criteria.

   If the Automatic Query option is turned on, Microsoft Query automatically runs the query and displays a result set containing only the records that meet your criteria.

Query Now button

   If the Automatic Query option is turned off, click the Query Now button on the toolbar (or choose Query Now from the Records menu) to run your query and see the result set.

4. Repeat Steps 1 through 3 to specify additional criteria and see the result set.

Note If the Automatic Query option is turned on, you see immediate results when you specify criteria. However, this slows down the process of designing a query, because Microsoft Query runs the query every time you change the criteria. In addition, you can't use the Add Criteria button to specify more than one criterion for the same field if the Automatic Query option is on.

Automatic Query button

If you want to specify all your criteria before you see the results, or if you want to specify more than one criterion for the same field, turn off the Automatic Query option. You can turn it off by choosing Automatic Query from the Records menu to remove the check mark next to the command or by clicking the Automatic Query button on the toolbar so the button isn't recessed.

How the Add Criteria Button Works

When you use the Add Criteria button to specify criteria, Microsoft Query follows simple rules to determine whether or not to add the criteria as additional (And) criteria or alternative (Or) criteria.

For example, suppose you've specified the criterion "Country is France," and you use the Add Criteria button to add the criterion "Order amount is 5000." Microsoft Query must determine whether your complete criterion is "Country is France *and* order amount is 5000" or "Country is France *or* order amount is 5000."

When combining criteria, Microsoft Query uses the following rules:

- **If you've already specified criteria for a field, Microsoft Query adds new criteria for the field as alternative (Or) criteria** For example, if you've specified the criterion "Country is France" and you add the criterion "Country is Germany," Microsoft Query interprets your complete criterion as "Country is France *or* Country is Germany" because both criteria apply to the COUNTRY field.

  Similarly, if you've specified the criterion "Country is France and order amount is 5000" and you add the criterion "Country is Germany," Microsoft Query interprets your complete criterion as "Country is France and order amount is 5000; *or* Country is Germany."

  Note If you want use the Add Criteria button to specify more than one criterion for a field, you must turn off the Automatic Query option.

- **If you haven't specified any criteria for a field, Microsoft Query adds new criteria for the field as additional (And) criteria** For example, if you've specified the criterion "Country is France" (for the COUNTRY field) and you add the criterion "Order amount is 5000" (for the ORDER_AMT field), Microsoft Query interprets your complete criterion as "Country is France *and* order amount is 5000."

In some cases, you may not be able to get the results you want using the Add Criteria button. If this happens, use the Criteria pane to specify your criteria instead.

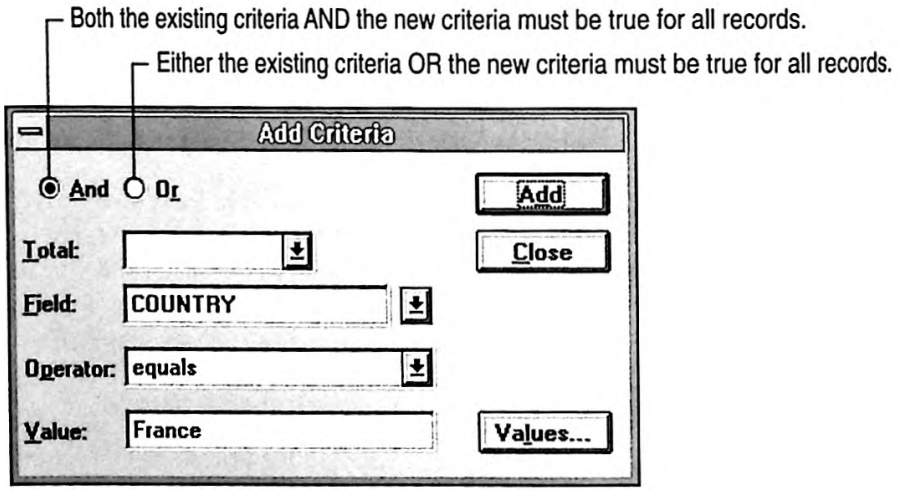
Using the Add Criteria Dialog Box to Specify Criteria

When you use the Add Criteria dialog box to specify criteria, you have the flexibility to retrieve records that meet a variety of criteria.

▶ **To retrieve records using the Add Criteria dialog box**

1. From the Criteria menu, choose Add Criteria.

   Microsoft Query displays the Add Criteria dialog box.



2. If the query already includes criteria, select the And option or the Or option.
   - Select And if you are specifying additional criteria and both the existing *and* the new criteria must be true. For example, suppose you've specified the criterion "Country is France," and you want to add the criterion "Order amount is 5000." If you select the And option, Microsoft Query interprets your complete criterion as "Country is France *and* order amount is 5000."

- Select Or if you are specifying alternative criteria and either the existing *or* the new criteria must be true. For example, suppose you've specified the criterion "Country is France," and you want to add the criterion "Order Amount is 5000." If you select the Or option, Microsoft Query interprets your complete criterion as "Country is France *or* order amount is 5000."

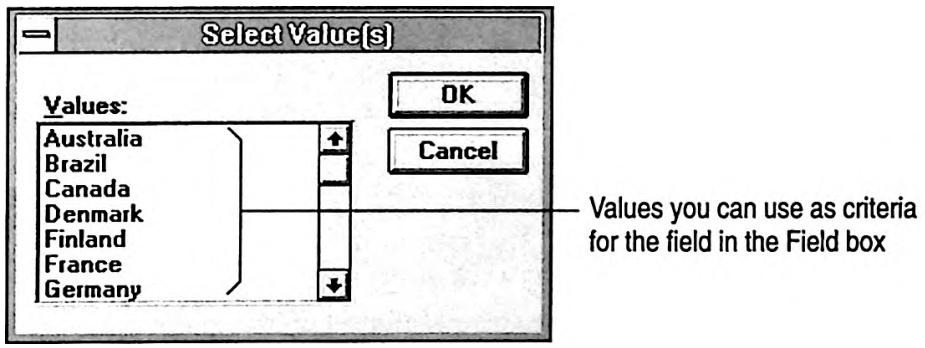
If there are no existing criteria in the query, the And option and the Or option are unavailable.

3. Click the arrow next to the Field box, and then select the field you want to specify criteria for in the list.
4. Click the arrow next to the Operator box, and then select the condition (operator) that must be true for the field you selected.

   For more information about operators, see "Specifying Criteria Using an Expression" later in this chapter.
5. Type the value you want in the Value box.

   –Or–

   If you want to use a value that's already in the field as part of your criteria, choose the Values button to see a list of existing values. Select the value you want, and then choose the OK button.



Tip To select more than one value from the list, simply click the values you want.

6. In the Add Criteria dialog box, choose the Add button, and then choose the Close button.

   Microsoft Query adds the new criterion to your query. If this is the first time you've specified criteria for this query since you created or opened it, Microsoft Query automatically displays the Criteria pane.

Query Now button

7. If the Automatic Query option is turned off, click the Query Now button on the toolbar to run your query and view the result set.

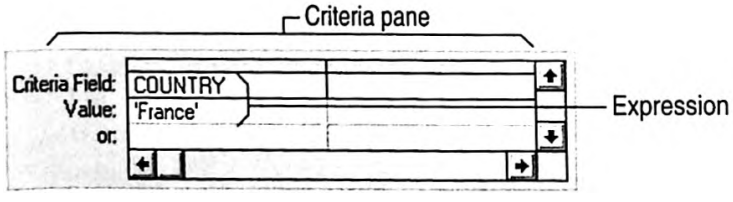
Note To learn about the Total box in the Add Criteria dialog box, see Chapter 5. "Performing Calculations on Data."

Using the Criteria Pane to Specify Criteria

Microsoft Query stores criteria in the Criteria pane. When you specify criteria using the Add Criteria button or the Add Criteria dialog box, Microsoft Query adds the criteria to the Criteria pane.

You can also specify your criteria by typing directly in the Criteria pane. This method of specifying criteria gives you the greatest flexibility and — as you become more familiar with expressions — is faster to use than the Add Criteria dialog box.

The Criteria pane displays your criteria using an *expression*. For example, if you've specified the criterion "Country is France," the Criteria pane looks like this.



▶ **To display the Criteria pane**

View Criteria button

- Click the View Criteria button on the toolbar.

  -Or-

  From the View menu, choose Criteria.

  Microsoft Query displays the Criteria pane.

To hide the Criteria pane, click the View Criteria button again (the button is no longer recessed), or choose Criteria from the View menu to remove the check mark.

Adding Fields to the Criteria pane

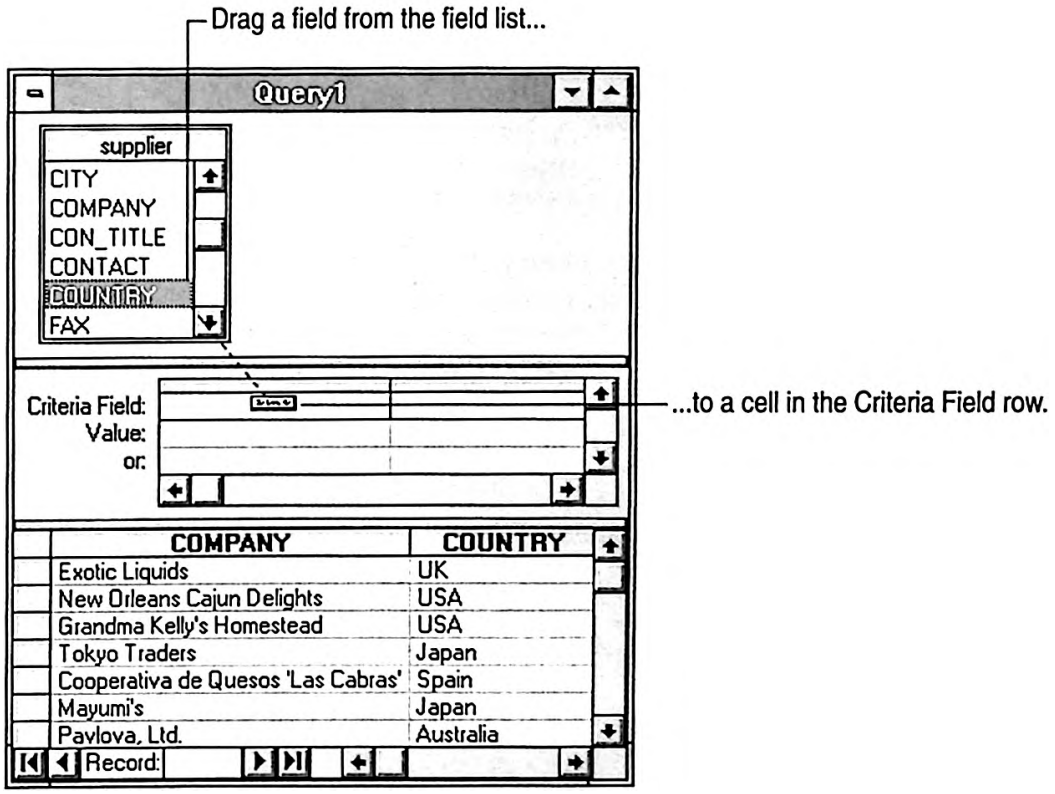
You add the fields you want to specify criteria for to the Criteria pane. The table's field list in the Table pane displays all the fields you can choose from.

View Criteria button

▶ To add a field to the Criteria pane

1. If the Criteria pane isn't already displayed, click the View Criteria button on the toolbar to display it.
2. If the Table pane isn't displayed, click the View Tables button on the toolbar.
3. Drag the field you want to specify criteria for from the table's field list to a cell in the Criteria Field row in the Criteria pane.

View Tables button



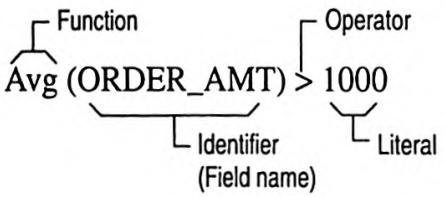
Microsoft Query displays the field name in the Criteria pane.

You can also add a field to the Criteria pane by:

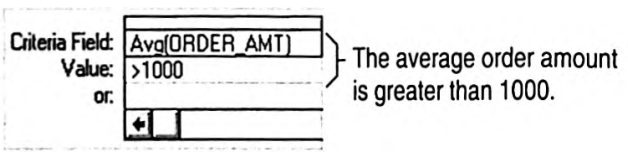
- Typing the field name in a Criteria Field cell and pressing ENTER.
- Clicking a Criteria Field cell, clicking the down arrow in the cell, and selecting the field in the list.

Specifying Criteria Using an Expression

In the Criteria pane, you specify criteria using an expression. An *expression* is a combination of operators, identifiers, functions, and literal values that evaluates to a single value. The following example, which specifies the criterion "Average order amount is greater than 1000," illustrates an expression and its parts.



When entered in the Criteria pane, the expression looks like this.



The elements on the left side of the operator appear in the Criteria Field row; the rest of the expression (including the operator) appears in the Value row.

Functions

A *function* returns a value based on the results of a calculation or other operation. For example, the **Sum** function returns the sum of two or more values. Microsoft Query assumes that your data source allows you to use the functions listed in the following table.

Function	Returned value
Avg	The average of a set of values in a field
Count	The number of selected records
Max	The maximum of a set of values in a field
Min	The minimum of a set of values in a field
Sum	The sum of a set of values in a field

Note Some data sources support other functions as well. To find out which functions your data source supports, see the documentation that came with the driver your data source uses, or contact the driver vendor. (If your data source uses an ODBC driver that came with Microsoft Query for Windows, click "ODBC Drivers" in the Microsoft Query Help Contents, and then click the name of the driver.).

Identifiers

An *identifier* is simply a field name as defined in the underlying table. For example, ORDER_AMT is the identifier (field name) for a field that contains order amounts. You can use an expression (such as PRICE*QUANTITY) in place of an identifier.

Operators

An operator tells Microsoft Query to perform an operation. For example, the * operator tells Microsoft Query to multiply two numbers. Microsoft Query assumes that your data source allows you to use the arithmetic, comparison, logical, and other operators listed in the following tables.

Note Some data sources support additional operators not listed in the tables below. To find out which operators your data source supports, see the documentation that came with the driver your data source uses, or contact the driver vendor. (If your data source uses an ODBC driver that came with Microsoft Query for Windows, click "ODBC Drivers" in the Microsoft Query Help Contents, and then click the name of the driver.)

Arithmetic Operators

You use arithmetic operators to perform numeric calculations. For example, the following expression uses the + operator to calculate the sum of the values in the ORDER_AMT and FREIGHT fields:

ORDER_AMT+FREIGHT

Arithmetic operator	Operation
*	Multiply two numbers
+	Add two numbers
–	Subtract one number from another
/	Divide one number by another

Note Arithmetic operators may vary, depending upon your data source, but most data sources support the standard arithmetic operators listed in the previous table.

Comparison Operators

You use comparison operators to compare two values. For example, the following expression uses the < operator to retrieve records for which there are fewer than five units in stock:

IN_STOCK<5

Comparison operator	Meaning
<	Less than
<=	Less than or equal to
>	Greater than
>=	Greater than or equal to
=	Equal to
<>	Not equal to

Logical Operators

You use logical operators with expressions that Microsoft Query evaluates as either true or false. In the following example, the **And** operator combines the expression COUNTRY = 'Japan' with the expression COMPANY = 'Tokyo Traders.' The entire expression is true if the country is Japan and the company is Tokyo Traders:

COUNTRY = 'Japan' And COMPANY = 'Tokyo Traders'

Logical operator	Meaning
And	This criterion **And** another criterion must be true for records in the result set.
Or	This criterion **Or** another criterion must be true for records in the result set.
Not	This criterion must **Not** be true for records in the result set.

Other Operators

The following table lists other operators you can use with Microsoft Query.

Operator	Description	Example
Between	Determines whether a value falls within a certain range	Between 10 And 100
In	Determines whether a value is equal to any of several values in a list	In('British Columbia','Quebec')
Is	With the word Null, determines whether a value is null (has no value) or not null	Is Null Is Not Null
Like	Uses a wildcard character to compare two values	Like 'Sm%'

Literals

A *literal* is a number, a date, or text that Microsoft Query uses exactly as you type it. Some examples of literals are 100 (number), #1993-01-15# (date), and 'British Columbia' (text).

▷ **To specify criteria using an expression**

1. In the Criteria pane, enter the field you want to specify criteria for in the Criteria Field cell.
2. In the Value cell below the Criteria Field cell, type an expression that indicates what must be true about data in the field.

After you type the expression and press ENTER, Microsoft Query automatically adds single quotation marks ('') around text and number signs (#) around dates. However, it's a good idea to enter the quotation marks and number signs yourself to make sure that Microsoft Query recognizes values correctly as text or dates.

Note Some data sources use characters other than quotation marks to surround text. To find out what characters your data source displays, see the documentation that came with the driver your data source uses, or contact the driver vendor. (If your data source uses an ODBC driver that came with Microsoft Query for Windows, click "ODBC Drivers" in the Microsoft Query Help Contents, and then click the name of the driver.)

Here are tips for entering expressions that include dates, text, or numbers:

- **Numbers** Type digits and decimal points only. Don't use currency symbols or a symbol (such as a comma) for separating thousands.
- **Dates** Microsoft Query recognizes dates in a variety of formats. One you can always use is the format yyyy-mm-dd. For example, you can type 1993-01-15 for January 15, 1993.
- **Text** Enclose text in quotation marks if it includes more than one word.

Examples of Expressions

Here are some examples of expressions that specify criteria and the records that would be included in the result set.

This expression	Retrieves records in which
'France'	The value is France.
Not 'France'	The value is not France.
In ('France','Germany','Italy')	The value is France, Germany, or Italy.
<'M'	The value begins with a letter between A and L.
>='M'	The value begins with a letter between M and Z.
100	The numeric value is 100.
<=20	The numeric value is less than or equal to 20.
>=#1993-01-15#	The date is on or after January 15, 1993.
Between #1993-01-01# And #1993-12-31#	The date is in the year 1993.
Is Null	The field does not contain a value.
Is Not Null	The field contains a value.

Using Wildcard Characters

If you want to search for a pattern of characters—not a specific value—you can use wildcard characters, such as a percent sign (%) or an underscore (_). As the following examples show, you can use an underscore as a placeholder for any single character and a percent sign for more than one character.

If you search for	Microsoft Query displays records with these values
Sm_th	Smith Smyth
L%ng	Ling Doverling Leka Travel and Trading L378NG

Note The wildcard characters you can use vary, depending upon your data source. To find out which wildcard characters your data source recognizes, see the documentation that came with the driver your data source uses, or contact the driver vendor. (If your data source uses an ODBC driver that came with Microsoft Query for Windows, click "ODBC Drivers" in the Microsoft Query Help Contents, and then click the name of the driver.)

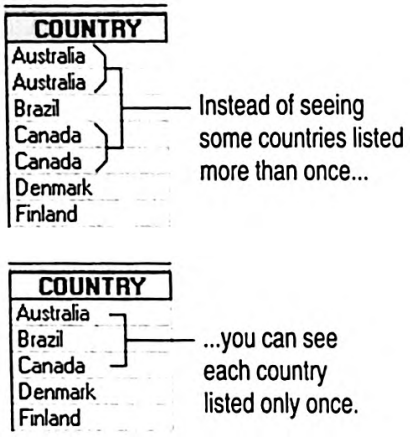
More Information To see an example of a criteria expression that uses wildcard characters, see "Retrieving Records That Contain Values You Specify" at the end of this chapter.

Displaying Unique Values

After you specify criteria, you may want to further streamline your data by eliminating duplicate values in your query's result set.

For example, suppose you want to see a list of the countries where your suppliers are located. If you have more than one supplier in the same country, you'll see the

name of that country repeated in the query results. If you want to see each country listed only once, you can tell Microsoft Query to display only unique values.



▶ **To display only unique values**

1. From the View menu, choose Query Properties.

   Microsoft Query displays the Query Properties dialog box.

2. Select the Unique Values Only check box.

   When the option is turned on, the check box contains an x.

3. Choose the OK button.

   Microsoft Query displays only records with unique values in the result set.

Editing Criteria

If you're not getting the results you want, you can change your criteria. You can edit the criteria in the Criteria pane by either:

- Selecting the criteria you want to change and typing new criteria.
- Using the Edit Criteria dialog box.

▶ **To edit criteria using the Edit Criteria dialog box**

View Criteria button

1. If the Criteria pane isn't already displayed, click the View Criteria button on the toolbar to display it.

2. In the Criteria pane, double-click the cell containing the criteria value you want to change.
   - To specify a different field, double-click a cell in the Criteria Field row.
   - To specify a different operator or value, double-click the Value row.

   Microsoft Query displays the Edit Criteria dialog box with the appropriate options available.
3. Make the changes you want.

   Microsoft Query updates the criteria in the Criteria pane to reflect your changes.

Deleting Criteria

You may want to experiment with different criteria. If you want to try new criteria, you can quickly delete all or part of the existing criteria in your query.

▶ **To delete all the criteria in a query**

- From the Criteria menu, choose Remove All Criteria.

  Microsoft Query deletes all the criteria for your query. If the Automatic Query option is turned on, Microsoft Query automatically runs the query and displays all the records in the result set.

Query Now button

  If the Automatic Query option is turned off, click the Query Now button on the toolbar to run the query and see the result set.

▶ **To delete a column or row in the Criteria pane**

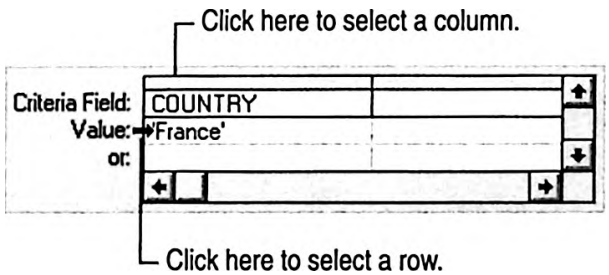
1. If the Criteria pane isn't displayed, click the View Criteria button on the toolbar to display it.

View Criteria button

2. To delete a column, click its column selector.

   -Or-

   To delete a row, place the pointer over the left edge of the row you want to delete. When the pointer changes to an arrow, click the row's edge.



3. Press the DEL key.

   Microsoft Query deletes the row or column you selected.

Criteria Examples

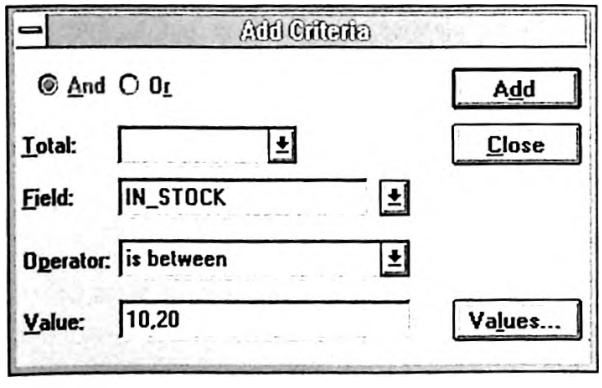
This section presents examples of criteria you can use to retrieve a subset of records from the Northwind Traders data. Each example illustrates the easiest way to specify the criteria. (For more information on the Northwind Traders sample data, see Appendix A, "The Northwind Traders Sample Data.")

Example

Retrieving a Range of Records

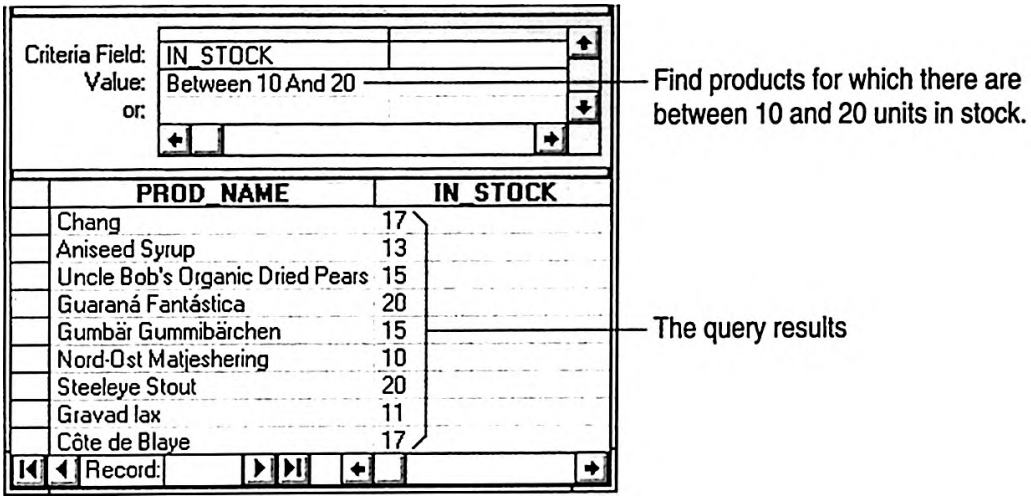
Suppose you want to find products for which there are between 10 and 20 units in stock.

Create a query, and add the Product table. Add the PROD_NAME and IN_STOCK fields to the Data pane. From the Criteria menu, choose Add Criteria and specify criteria for the IN_STOCK field as shown in the following illustration. Then choose the Add button.



Tip You can choose the Values button to see a list of values you can use as criteria. To select more than one value from the list, simply click the values you want. In this case, you would click 10 and then 20, and then you would choose the OK button.

If the Criteria pane isn't displayed, choose Criteria from the View menu to display it.



If the Automatic Query option is on, Microsoft Query displays only the records from the Product table in which the IN_STOCK value is between 10 and 20.

Query Now button

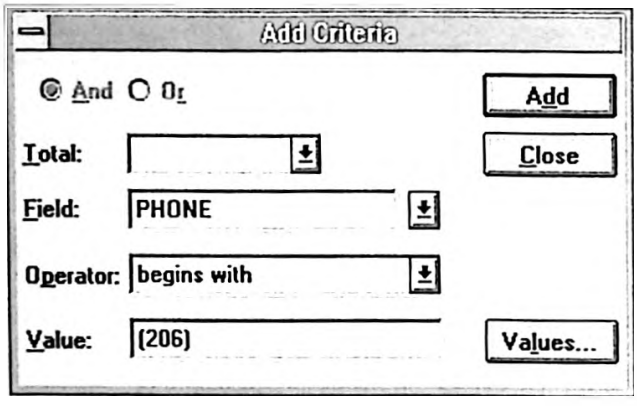
If the Automatic Query option is turned off, click the Query Now button on the toolbar to run the query and view the result set.

Example

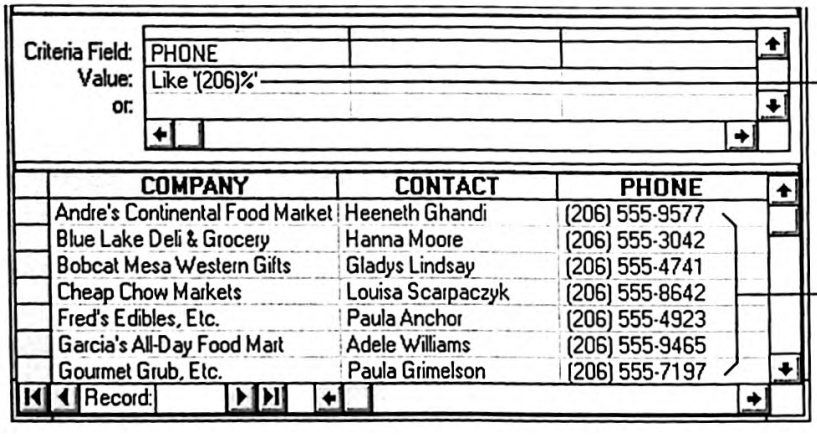
Retrieving Records That Contain Values You Specify

What if you want to conduct a phone survey of all your local customers? For example, suppose you want to call all customers whose phone numbers begin with the area code (206).

Create a query, and add the Customer table. Add the COMPANY, CONTACT, and PHONE fields to the Data pane. From the Criteria menu, choose Add Criteria, and specify criteria for the PHONE field as shown in the following illustration. Then choose the Add button.



If the Criteria pane isn't displayed, choose Criteria from the View menu to display it.



Query Now button

If the Automatic Query option is turned on, Microsoft Query displays only the records from the Customer table in which the PHONE value begins with (206).

If the Automatic Query option is turned off, click the Query Now button on the toolbar to run the query and view the result set.

Example

Retrieving Records Using Alternative (Or) Criteria

Suppose you want to see suppliers in Canada *or* Germany.

Create a query, and add the Supplier table. Add the COMPANY and COUNTRY fields to the Data pane. Turn off the Automatic Query option.

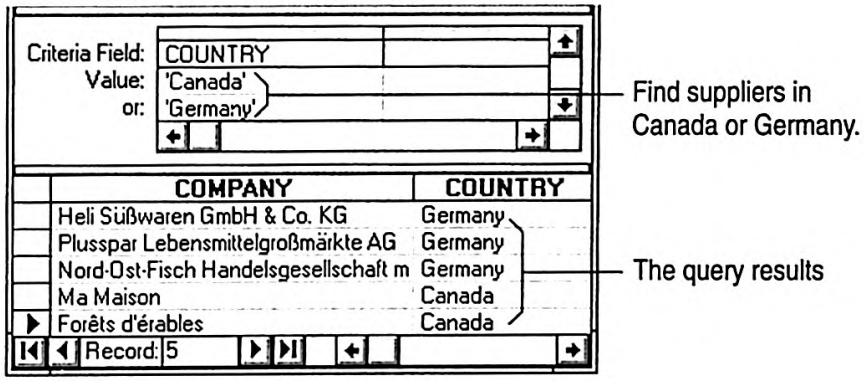
Important You must turn off the Automatic Query option before you can specify the criteria for this example using the Add Criteria button.

Add Criteria button

In the Data pane, click any cell in the COUNTRY column that contains Canada, and then click the Add Criteria button on the toolbar. Then click any cell in the COUNTRY column that contains Germany, and click the Add Criteria button again. Because you've already specified a criterion for the field, Microsoft Query assumes you want to add the second criterion as an alternative (Or) criterion.

Query Now button

Click the Query Now button on the toolbar to run your query.



Microsoft Query connects criteria in the two Value rows of the Criteria pane with the **Or** operator and retrieves records that meet the criterion in the first row *or* the second row.

Example

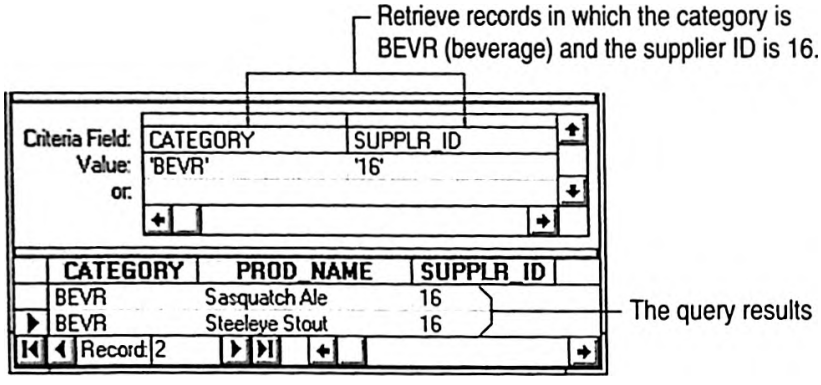
Retrieving Records Using Additional (And) Criteria

Suppose you want to find out which beverages a particular supplier sells.

Create a query, and add the Product table. Add the CATEGORY, PROD_NAME, and SUPPLR_ID fields to the Data pane.

Add Criteria button

In the CATEGORY column, click a cell that contains the value BEVR, and click the Add Criteria button on the toolbar. Then in the SUPPLR_ID column, click a cell that contains the ID number for the supplier you want, and click the Add Criteria button again. Because you haven't previously specified any criteria for the SUPPLR_ID field, Microsoft Query assumes you want to add the second criterion as an additional (And) criterion.



Microsoft Query connects criteria in the same row of the Criteria pane with the **And** operator and finds records that meet the criteria for the first field *and* the second field.

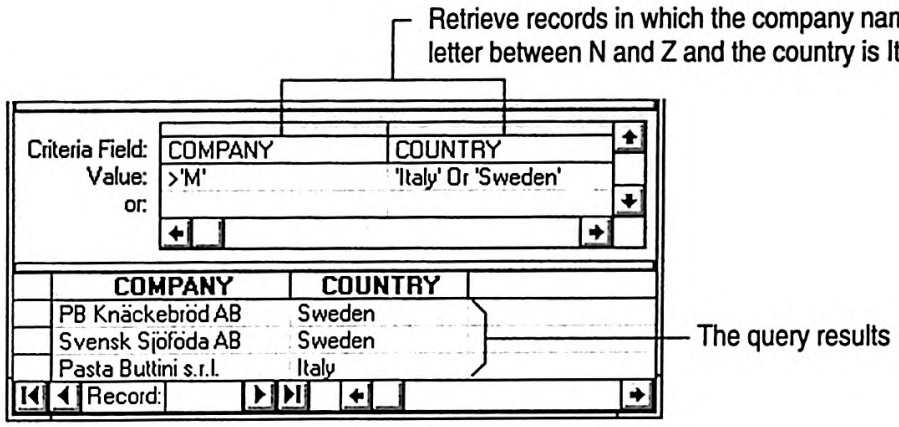
Example

Retrieving Records Using Additional (And) and Alternative (Or) Criteria Together

What if you need to find all Northwind suppliers whose company names start with a letter between N and Z *and* who are located in either Italy *or* Sweden?

Create a query, and add the Supplier table. Add the COMPANY and COUNTRY fields to the Data pane.

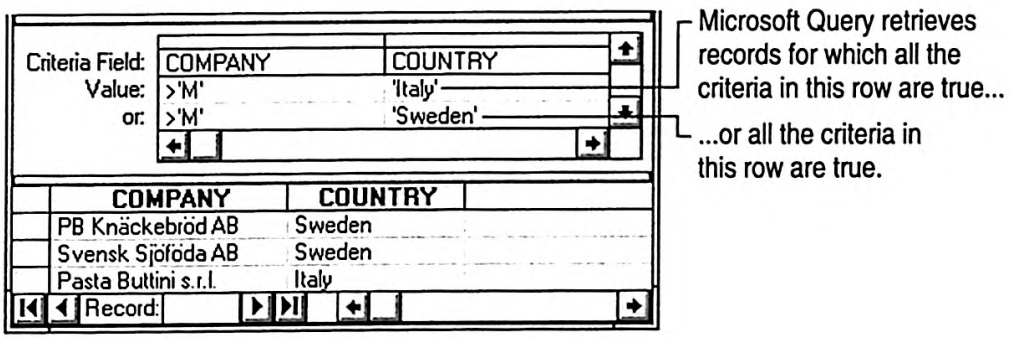
If the Criteria pane isn't displayed, choose Criteria from the View menu. Specify the criteria shown in the following illustration by typing directly in the Criteria pane. When you've finished typing, press the ENTER key.



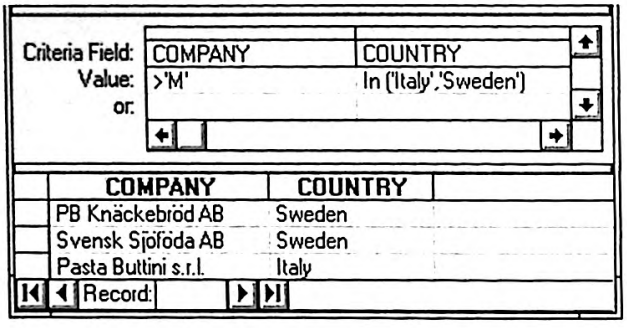
Query Now button

If the Automatic Query option is turned on, Microsoft Query displays the companies whose name begins with a letter between N and Z and that are located in Italy or Sweden. (If the Automatic Query option is turned off, click the Query Now button to run the query and view the result set.)

Often, there are several ways you can specify criteria to get the results you want. For example, to find the same records displayed in the previous illustration, you can specify the following criteria.



You can also specify these criteria to get the same results.

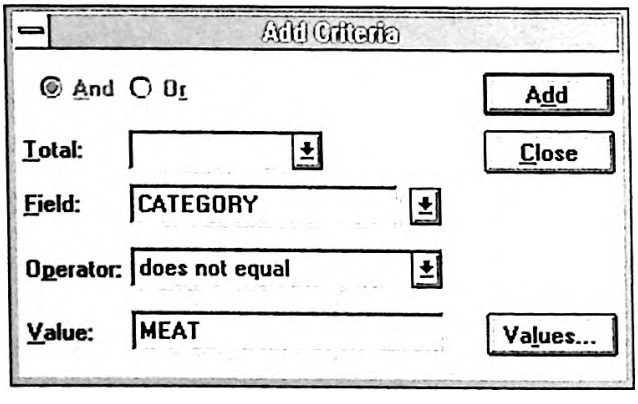


Example

Retrieving Records That Don't Match a Value

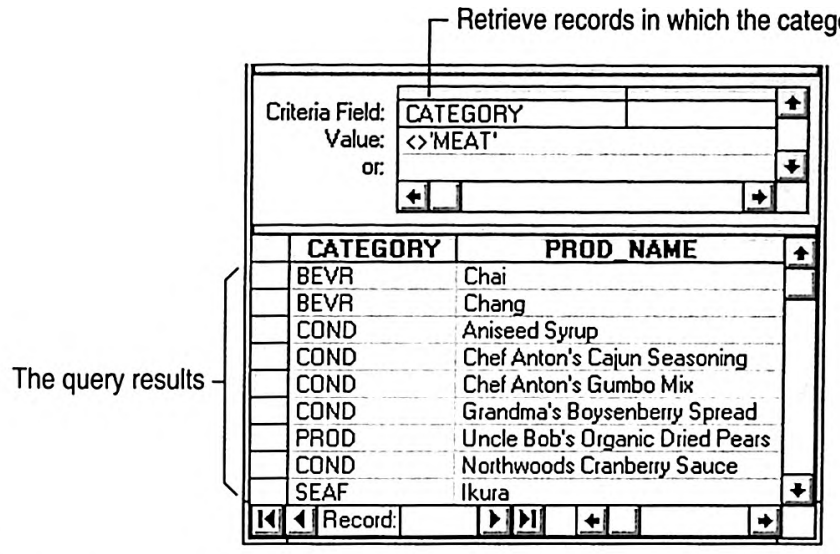
Suppose you want to find all products that are *not* meat products.

Create a query, and add the Product table. Add the CATEGORY and PROD_NAME fields to the Data pane. From the Criteria menu, choose Add Criteria, and specify criteria for the CATEGORY field as shown in the following illustration. Then choose the Add button.



Query Now button

If the Automatic Query option is turned on, Microsoft Query displays the following records. (If the Automatic Query option is turned off, click the Query Now button to run the query and view the result set.)

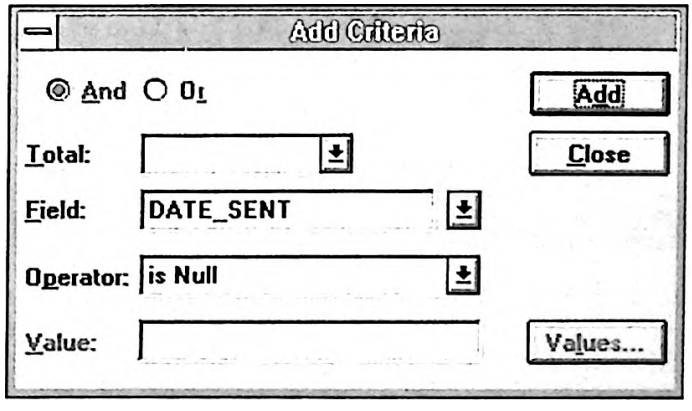


Example

Retrieving Records That Are Missing Values

You may want to find all orders that haven't shipped and are therefore missing a ship date.

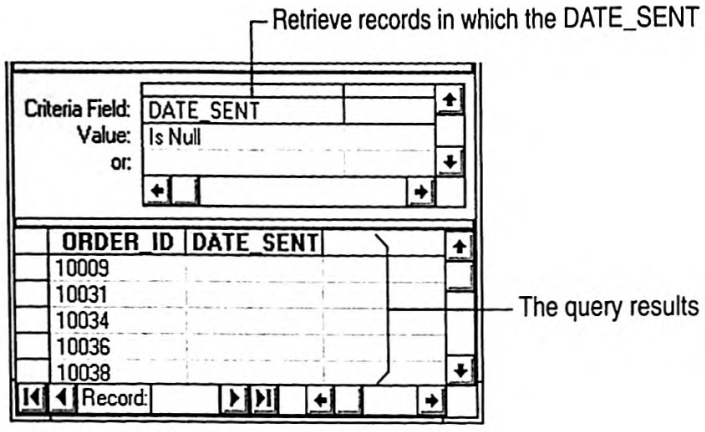
Create a query, and add the Orders table. Add the ORDER_ID and DATE_SENT fields to the Data pane. From the Criteria menu, choose Add Criteria, and specify criteria for the DATE_SENT field as shown in the following illustration. Then choose the Add button.



Query Now button

If the Automatic Query option is turned on, Microsoft Query displays only the orders that have no entry in the DATE_SENT field. (If the Automatic Query

option is turned off, click the Query Now button to run the query and view the result set.)



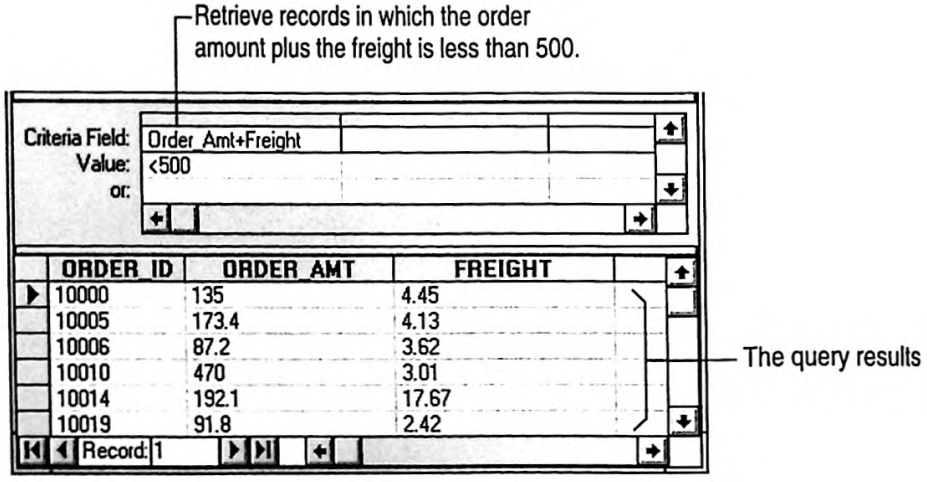
Example

Retrieving Records with Values Based On a Calculation

Suppose you want to find orders for which the order amount plus the freight is less than $500. First you tell Microsoft Query to perform the calculation you want (order amount plus freight), and then you specify criteria for the results ("is less than 500").

Create a new query, and add the Orders table. Add the ORDER_ID, ORDER_AMT, and FREIGHT fields to the Data pane.

If the Criteria pane isn't displayed, choose Criteria from the View menu. Enter the criteria shown in the following illustration by typing directly in the Criteria pane.



Query Now button

If the Automatic Query option is turned on, Microsoft Query displays the orders you want. (If the Automatic Query option is turned off, click the Query Now button to run the query and view the result set.)

CHAPTER 5

Performing Calculations on Data

What if you want to know the number of orders you received last month, the average unit price for your products, or the total quantity of products in each order? You don't have to calculate these values yourself — Microsoft Query can calculate them for you.

Once these values are calculated, you don't want to store them with the rest of your data, because the values will change if the data used in the calculation changes. Instead, you tell Microsoft Query what type of calculation you want to perform and which data you want to use in the calculation. When you run your query again, Microsoft Query recalculates the values using the most current data from the underlying table.

In this chapter, you'll learn how to:

- Perform calculations with Microsoft Query.
- Calculate totals on all records in a table.
- Calculate totals on groups of records.
- Specify criteria in queries containing totals.
- Create your own expressions to perform calculations.

Performing Calculations with Microsoft Query

To perform a calculation, Microsoft Query evaluates an expression and then displays the results in a designated field (column) in the result set. For example, Sum(ORDER_AMT) is an expression that calculates the sum of all the values in the ORDER_AMT field. (For a detailed explanation of expressions, see Chapter 4, "Retrieving the Records You Want.")

For the five most common types of calculation (sum, average, count, minimum, and maximum), you don't need to define the expression yourself; Microsoft Query defines it for you. You just select a field (column) in the result set where you want the results of the calculation to appear and then choose the type of calculation you want to perform on the values in that field. Microsoft Query defines the expression behind the scenes and replaces the original values in the field with the result of the calculation. (The values in the underlying table are not replaced, however.)

The following table describes the five types of calculation that Microsoft Query defines for you. These types of calculation are classified as *totals*. (For information about the types of data listed in the following table, refer to your data source's documentation on data types.)

Choose this type of total	To calculate this value in the result set	In a field with this type of data
Sum	The sum of values in a field.	Number
Avg	The average of values in a field.	Number
Count	The number of values in a field (not counting null values).	Number, Date/Time, Yes/No (Boolean), Text, Memo
Min	The lowest value in a field. (In a Text field, the lowest values are those starting with the letter A.)	Number, Date/Time, Yes/No (Boolean), Text
Max	The highest value in a field. (In a Text field, the highest values are those starting with the letter Z.)	Number, Date/Time, Yes/No (Boolean), Text

Note Microsoft Query calculates these totals using all the records in the table, even if you've chosen Query Properties from the View menu and selected Unique Records Only in the Query Properties dialog box.

Microsoft Query can also process custom calculations that you define. For more information on defining your own calculations, see "Creating Your Own Expressions to Perform Calculations" at the end of this chapter.

Calculating Totals on All Records in a Table

You can calculate a single total for a field in a query's result set using all the records in a table. For example, you can find the total number of Northwind suppliers listed in the Supplier table or the price of the least expensive product in the Product table. When you calculate a total, the new value replaces the original data for the field in the result set. (However, it does not replace the values in the underlying table.)

To calculate a total, you can use the Totals button or the Edit Column dialog box.

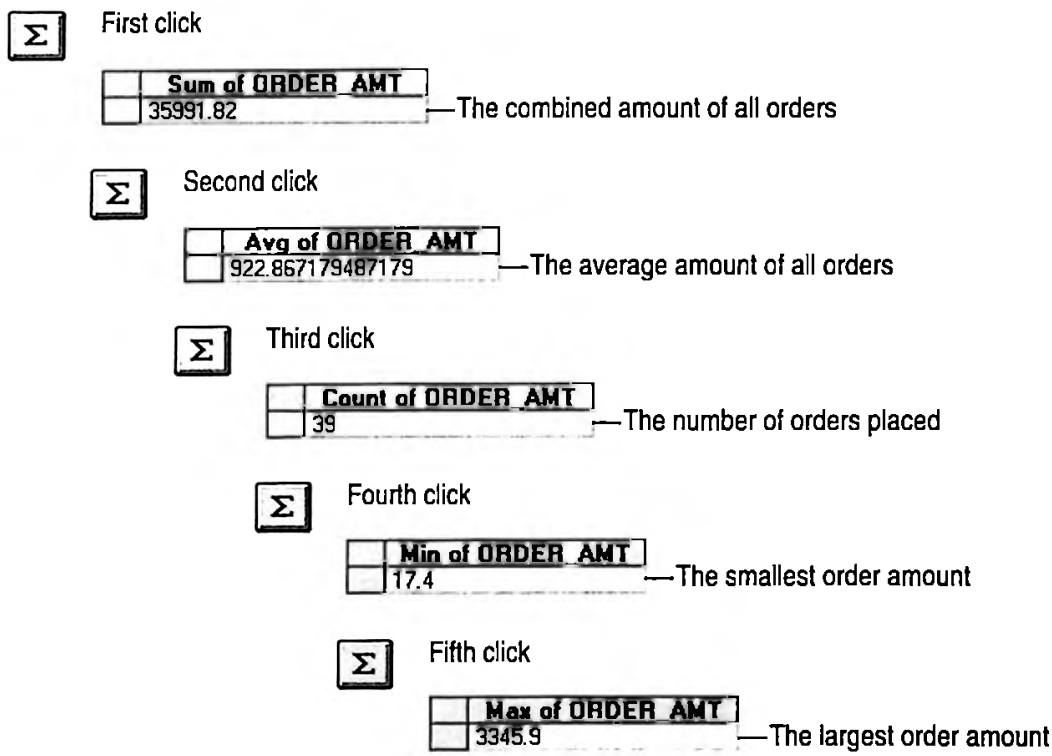
▶ To perform a calculation using the Totals button

1. Create a query, and add to the Data pane only the field or fields containing the values you want to total.

Totals button

2. Click anywhere in the column (field) for which you want to calculate a total, and then click the Totals button on the toolbar.

   Each time you click the button, Microsoft Query calculates and displays a different type of total (which is indicated in the column heading). Continue clicking the button until Microsoft Query displays the type of total you want.



Note Only Count, Min, and Max are available for fields containing dates, times, or text. Only Count is available for a Memo field (a field that contains alphanumeric characters and usually stores several sentences or paragraphs).

Query Now button

If the Automatic Query option is turned off, click the Query Now button on the toolbar to run your query and display the results of the calculation.

3. Repeat Step 2 for each column on which you want to perform a calculation.

Note The data source determines the format Microsoft Query uses to display the result of the calculation. To change the format, see the documentation for your data source.

▶ To remove a total using the Totals button

1. Select the column containing the total you want to remove.
2. Click the Totals button until the column heading contains the original field name.

Totals button

Microsoft Query displays the original, untotaled values.

▶ To calculate a total using the Edit Column dialog box

If you want to calculate a total in one step, without cycling through other calculations, use the Edit Column dialog box.

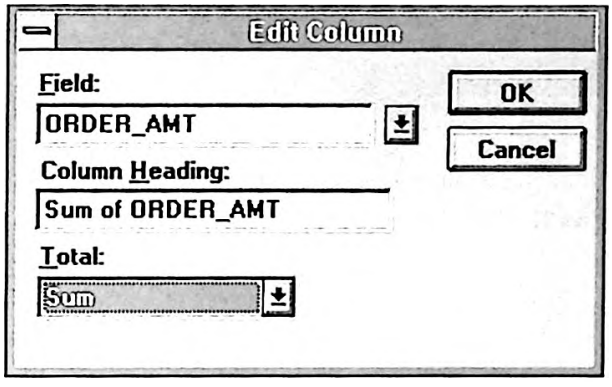
1. Create a query, and add to the Data pane the field or fields containing the values you want to total.
2. Double-click the column heading of the column for which you want to calculate a total.

   -Or-

   Click anywhere in the column, and then choose Edit Column from the Records menu.

   Microsoft Query displays the Edit Column dialog box with the name of the selected field in the Field box.

3. In the Total drop-down list box, select the type of total you want Microsoft Query to calculate (such as Sum, Avg, or Min), and then choose the OK button.



Note You don't have to use the name that Microsoft Query places in the column heading of a field that you total. In the Edit Column dialog box, type a new name in the Column Heading box, and then choose the OK button. Microsoft Query changes the column heading only in the result set, not in the underlying table.

▶ **To remove a total using the Edit Column dialog box**

1. Double-click the column heading of the column whose total you want to remove.

   -Or

   Click anywhere in the column, and choose Edit Column from the Records menu.

   Microsoft Query displays the Edit Column dialog box.
2. In the Total drop-down list box, scroll to the top of the list, and then select the blank area.
3. Choose the OK button.

   Microsoft Query displays the original, untotaled values.

Example

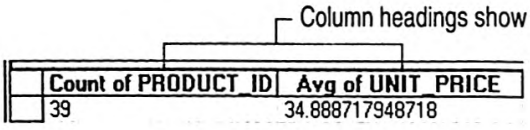
Calculating Totals on All Records in a Table

Suppose you want to count all the Northwind products and calculate the average unit price per product.

Create a query, and add the Product table. Add the PRODUCT_ID and UNIT_PRICE fields to the Data pane, and then select the PRODUCT_ID column.

Totals button

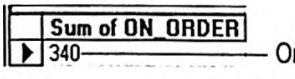
Click the Totals button on the toolbar until the column heading says "Count of PRODUCT_ID." Select the UNIT_PRICE column, and then click the Totals button until the column heading says "Avg of UNIT_PRICE."

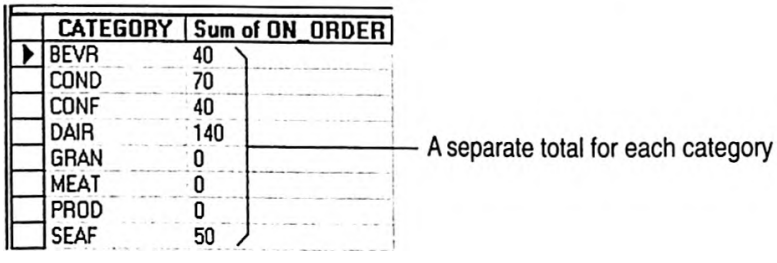


With a few clicks, you have the information you want: Northwind Traders sells 39 products, and their average unit price is $34.89.

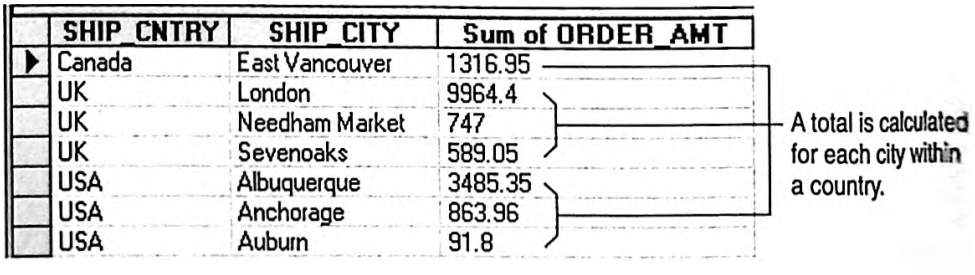
Calculating Totals on Groups of Records

You may find that you want to calculate separate totals for groups of records instead of one total for all records in a table. For example, you might want to know the total number of units that have been ordered for each category.





You can include additional fields in the result set to create more than one level of grouping so that one group is a subset of another group. For example, from the Orders table you can calculate the sum of Northwind order amounts using records that are grouped by country and then by city.



The number of grouping levels determines how Microsoft Query calculates the total. For instance, in the previous example, if you add the EMPLOY_ID field to the right of the SHIP_CITY column in the Data pane, Microsoft Query recalculates the sum of order amounts and displays a separate total for each employee within each city in a country.

	SHIP_CNTRY	SHIP_CITY	EMPLOY_ID	Sum of ORDER_AMT
▶	Canada	East Vancouver	888	1316.95
	UK	London	111	841.5
	UK	London	444	1148
	UK	Needham Market	444	747
	UK	London	555	1423.5
	UK	Sevenoaks	666	589.05
	UK	London	777	3345.9
	UK	London	888	3205.5

The total is recalculated for each employee.

To design this type of query, you add the field or fields you want to use for grouping the totals and the fields on which you want to calculate totals. When you calculate a total on a column, Microsoft Query automatically creates the grouping levels using any untotaled columns in the order the columns appear from left to right in the result set.

In the following example, when you calculate a total that counts the order IDs, Microsoft Query displays the number of orders for East Vancouver in Canada, then the number of orders for London in the United Kingdom, and so on.

	SHIP_CNTRY	SHIP_CITY	Count of ORDER_ID
▶	Canada	East Vancouver	1
	UK	London	6
	UK	Needham Market	1
	UK	Sevenoaks	1
	USA	Albuquerque	3
	USA	Anchorage	1
	USA	Auburn	1
	USA	Austin	2

Note With some data sources, you can display a group's total next to the individual amounts used to calculate that total. For more information, search Help for "displaying totals."

Example

Calculating a Total on One Group

Suppose you want to find the total value of Northwind orders for each country.

Totals button

Create a query, and add the Orders table. Add the SHIP_CNTRY and ORDER_AMT fields to the Data pane, and then select the ORDER_AMT column. Click the Totals button once to display each country's total.

Query Now button

Note If the Automatic Query option is turned off, click the Query Now button on the toolbar to run your query and display the calculated values.

	SHIP_CNTRY	Sum of ORDER_AMT
▶	Canada	1316.95
	UK	11300.45
	USA	23374.42

Total value of orders for each country

Example

Calculating Totals on Several Groups

Suppose you want the sum of order amounts broken down even further to show the sum of order amounts for individual customers in each country.

Modify the previous query by inserting the CUSTMR_ID field between the SHIP_CNTRY and Sum of ORDER_AMT columns in the Data pane. If the Automatic Query option is on, Microsoft Query will rerun the query and in the Sum of ORDER_AMT column recalculate a separate total for each customer in a country.

For each country... ...and for each customer... ...calculate the total value of orders.

	SHIP_CNTRY	CUSTMR_ID	Sum of ORDER_AMT
▶	Canada	MERRG	1316.95
	UK	BLUMG	1148
	UK	EASTC	747
	UK	EMPIT	5021.4
	UK	PICAF	1423.5
	UK	SEVES	1530

Changing the Grouping Order

By default, if you use more than one field (column) for grouping the totals, Microsoft Query creates the grouping levels in the order the columns appear from left to right in the Data pane. However, you can change how your totals are grouped by specifying a sort order for a grouping field. Microsoft Query groups data in sorted columns before data in unsorted columns, regardless of the columns' order in the Data pane.

In the previous example, the totals are grouped by SHIP_CNTRY first and then by CUSTMR_ID. If you want the totals grouped by CUSTMR_ID first and then by SHIP_CNTRY, you can specify a sort order for the CUSTMR_ID field. Microsoft Query groups data in the sorted CUSTMR_ID column before grouping

data in the unsorted SHIP_CNTRY column. (For information on sorting, see "Sorting Data in Columns," in Chapter 2, "Changing How Data Looks in the Data Pane.")

Example

Changing the Grouping Order

Modify the previous query by sorting CUSTMR_ID values in ascending order.

Totals are grouped in alphabetical order by CUSTMR_ID and then grouped by SHIP_CNTRY.

	SHIP_CNTRY	CUSTMR_ID	Sum of ORDER_AMT
▶	USA	BOBCM	94.88
	USA	CAESM	351
	UK	EASTC	747
	UK	EMPIT	5021.4
	USA	FOODI	731.8
	USA	FREDE	87.2
	USA	FRUGF	135

Specifying Criteria in Queries Containing Totals

Microsoft Query gives you flexibility in specifying criteria for queries in which you calculate totals. Depending on your needs, you may want to:

- **Calculate the total first and then specify criteria that limit records** For example, you can count all the orders placed by your customers but display results only for countries where customers placed more than 50 orders. In this case, Microsoft Query first counts the number of orders from each customer and then displays records only for countries with more than 50 orders.
- **Specify criteria that limit records first and then calculate the total** For example, you can find out how many orders over $1000.00 each customer placed. In this case, Microsoft Query retrieves only the order amounts greater than $1000.00 and then counts how many such orders each customer placed.

Calculating the Total First and Then Limiting Records

To calculate a total and then display only certain records in the result set, you tell Microsoft Query the type of total you want to calculate and then specify the criteria that the results must meet to be included in the result set.

▶ To calculate a total and then limit records

1. Add the fields you want to display in the Data pane.
2. Select the column (field) containing the data you want to total, and then click the Totals button on the toolbar until the column heading displays the type of total you want.

Totals button

3. Specify the criteria that the totals must meet to be included in the result set.

   For more information on specifying criteria, see Chapter 4, "Retrieving the Records You Want."

Query Now button

If the Automatic Query option is turned on, Microsoft Query displays only the records that meet the criteria. If the Automatic Query option is turned off, click the Query Now button on the toolbar to display the records.

Example

Calculating the Total First and Then Limiting Records

Suppose you want to find the customers in each country who placed two or more orders. In this case, you want Microsoft Query to count the orders first and then display only records for customers with two or more orders.

Step 1: Calculate the total

Totals button

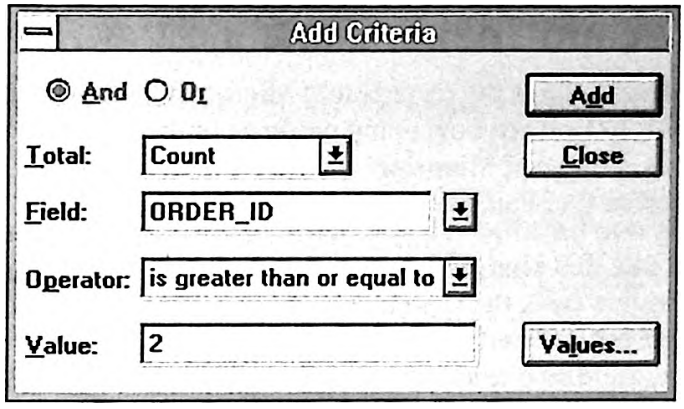
Create a query, and add the Orders table. Add the SHIP_CNTRY, CUSTMR_ID, and ORDER_ID fields to the Data pane, and then select the ORDER_ID column. Click the Totals button until the column heading says "Count of ORDER_ID."

	SHIP_CNTRY	CUSTMR_ID	Count of ORDER_ID
▶	Canada	MERRG	1
	UK	BLUMG	1
	UK	EASTC	1
	UK	EMPIT	2
	UK	PICAF	1
	UK	SEVES	1
	UK	SUGAA	1

Microsoft Query displays the number of orders placed by each customer in each country.

Step 2: Limit the records

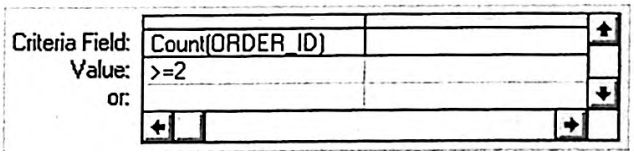
With the Count of ORDER_ID column still selected, choose Add Criteria from the Criteria menu. In the Add Criteria dialog box, the Total box displays the default total for the column, and the Field box displays the field name—not the column heading. In the Operator box, select "is greater than or equal to" in the drop-down list, and in the Value box, type **2**.



Now choose the Add button. Microsoft Query displays only the records for customers who have placed two or more orders.

	SHIP_CNTRY	CUSTMR_ID	Count of ORDER_ID
▶	UK	EMPIT	2
	USA	MORNS	2
	USA	RATTC	3
	USA	SILVS	2
	USA	VALUF	2

You can see the expression for the criterion you've specified by choosing Criteria from the View menu to display the Criteria pane. The Criteria Field cell contains the expression for the column with the values you totaled, and the Value cell contains the criterion that the results must meet to be included in the result set.



To bypass the Add Criteria dialog box, you can display the Criteria pane, and then type the expression and criterion directly into it. The Criteria Field cell must contain the actual expression for the total field, not the column heading. For example, in the previous example, you would type **Count(ORDER_ID)**, not **Count of ORDER_ID**, which is the title Microsoft Query places in the column heading.

Limiting Records First and Then Calculating the Total

You may want to limit the records that Microsoft Query uses to calculate a total. For example, to find out how many products in the MEAT category Northwind Traders sells, you want Microsoft Query to retrieve only records for meat products before it counts the number of products.

You can create this kind of query whether or not the field you're using to specify criteria—in this case, the CATEGORY field—is in the result set. If the field *is* in the result set but does *not* contain totals, use the following procedure to create the query. If the field you're using to specify criteria is *not* in the result set or *does* contain totals, you must follow the second procedure.

▶ To specify criteria using an untotaled column in a result set that contains totals

1. Add the field or fields you want to display in the Data pane.
2. Specify the criteria that the records must meet to be included in the result set.

   If the Automatic Query option is turned on, Microsoft Query displays only the records that meet the criteria. If the Automatic Query option is turned off, click the Query Now button on the toolbar to display the records.

Query Now button

3. In the Data pane, select the column containing the values you want to total, and then click the Totals button on the toolbar until the column heading displays the total you want.

Totals button

You may also want to specify criteria for the column you're totaling. For example, to find the sum of all the order amounts under $2000.00, you want Microsoft Query to retrieve only the records with order amounts less than $2000.00 before it calculates the sum of those orders.

Or you may want to specify criteria using a field that's not in the result set. In the previous example, for instance, you may want to count how many orders under $2000.00 each customer placed. In this case, you specify criteria using the ORDER_AMT field and include only the ORDER_ID and CUSTMR_ID fields in the result set to count the number of orders each customer placed.

Important If you don't use the following procedure for these types of queries, Microsoft Query won't combine the records you want to total. For example, if one customer placed three orders under $2000, Microsoft Query would display that customer's ID three times, each with an order ID count of one, instead of displaying the ID once with a combined count of three orders.

▶ To specify criteria using a totaled column or a column that's not in the result set

Totals button

1. Add the field or fields you want to display in the Data pane.
2. Calculate a preliminary total by selecting the column containing the values you want to total and then clicking the Totals button on the toolbar until the column heading displays the type of total you want.
3. From the Criteria menu, choose Add Criteria.

   Microsoft Query displays the Add Criteria dialog box.
4. In the Field box, select the field for which you want to specify criteria.

   This field can be the one you're using to calculate a total, or it can be a field that isn't in the result set.
5. In the Total drop-down list box, select Where.

   Microsoft Query displays the Where option in the Total box only if you've calculated a preliminary total, as you did in Step 2.
6. In the Operator and Value boxes, specify the criteria that records must meet to be used in the totals calculation.

   Microsoft Query recalculates the preliminary total using only the records that meet the criteria you've specified.

Example

Specifying Criteria Using a Field That's Not in the Result Set

Suppose you want to know how many orders over $1000.00 each customer placed. In the result set, you want to display each customer ID and the total number of orders over $1000.00. In this case, Microsoft Query first retrieves only records for which the ORDER_AMT value is greater than 1000 and then performs the calculation.

Totals button

Step 1: Calculate a preliminary total

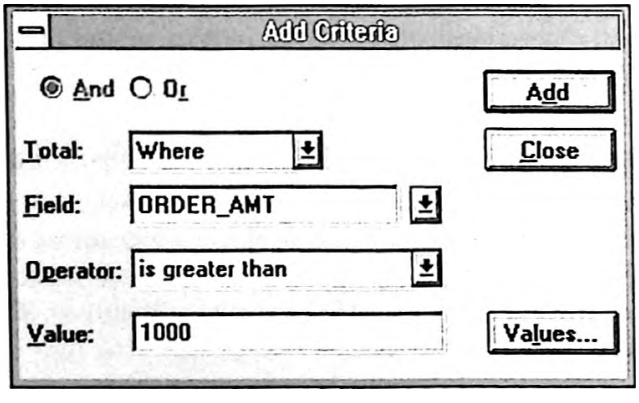
Create a query, and add the Orders table. Add the CUSTMR_ID and ORDER_ID fields to the Data pane. Select the ORDER_ID column, and then click the Totals button on the toolbar until the column heading says "Count of ORDER_ID."

CUSTMR_ID	Count of ORDER_ID
ANTHB	1
BLUMG	1
BOBCM	1
CAESM	1
EASTC	1
EMPIT	2
FOODI	1
FREDE	1
FRUGF	1
FRUGP	1

Preliminary count of orders before you specify criteria

Step 2: Limit the records, and then recalculate the total

From the Criteria menu, choose Add Criteria and specify criteria for the ORDER_AMT field as shown in the following illustration.



Now you choose the Add button. Microsoft Query shows how many orders over $1000.00 each customer placed.

CUSTMR_ID	Count of ORDER_ID
BLUMG	1
EMPIT	2
FRUGP	1
FUJIA	1
HIGHG	1
LIVEO	1
MERRG	1
MORNS	1
PICAF	1
RATTC	2

Note If you remove the total from this type of query but reapply it later, you have to reselect Where in the Total box in the Add Criteria dialog box for the field on which you set the criteria.

Creating Your Own Expressions to Perform Calculations

With Microsoft Query, you can perform other calculations on your data in addition to the totals calculations described earlier by defining a custom expression and creating a new column in the result set to display the results. This is useful when you want to use one or more totals in calculating another amount. For example, if employees receive a commission equaling 15 percent of their total sales, you can calculate each employee's commission by adding up the sales for each employee and multiplying the total by 0.15.

▶ **To perform a calculation using your own expression**

- In the Data pane, type the expression for the calculation in the column heading of the blank column, and then press ENTER.

  For instance, to find the sales commission described in the example, you would type **Sum(ORDER_AMT)*.15** in the column heading.

	EMPLOY_ID	Sum(Order_Amt)*.15
▶	111	790.755
	222	298.7145
	333	1354.332
	444	1046.6175
	555	242.145
	666	246.9975
	777	515.655
	888	850.9065

-Or-

From the Records menu, choose Add Columns, and then type the expression in the Field box.

Query Now button

If the Automatic Query option is turned on, Microsoft Query displays the results of the calculation below the column heading containing the expression. If the Automatic Query option is turned off, click the Query Now button on the toolbar to display the results of the calculation.

Note How you type an expression depends on the data source you're using. For detailed information, see the documentation for your data source. For general information, see "Specifying Criteria with an Expression," in Chapter 4, "Retrieving the Records You Want."

Example

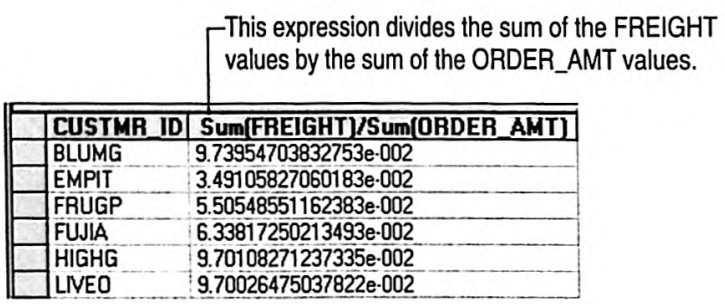
Using an Expression That Contains Several Totals

Suppose you want to find out what percentage of each customer's total order is spent on freight. To do this, you divide the amount each customer spends on freight by the amount he or she spends on the entire order. You need an expression that includes the FREIGHT and ORDER_AMT fields; however, you don't have to add these fields to the Data pane.

Create a query and add the Orders table. Add the CUSTMR_ID field to the Data pane. Type the following expression in the column heading of the blank column, and then press ENTER.

```
Sum(FREIGHT)/Sum(ORDER_AMT)
```

For each customer, Microsoft Query divides the amount spent on freight by the order amount.



CUSTMR_ID	Sum(FREIGHT)/Sum(ORDER_AMT)
BLUMG	9.73954703832753e-002
EMPIT	3.49105827060183e-002
FRUGP	5.50548551162383e-002
FUJIA	6.33817250213493e-002
HIGHG	9.70108271237335e-002
LIVEO	9.70026475037822e-002

Note Your data source determines the format Microsoft Query uses to display the result of the calculation. To change the format, see the documentation for your data source.

More Information For detailed information about expressions, see Chapter 4, "Retrieving the Records You Want."

CHAPTER 6

Creating Multiple-Table Queries

What if you want to see data that's stored in more than one table? For example, you might want to see a list of products with their suppliers' addresses. To get this information, you need data from both the Product and Supplier tables.

With Microsoft Query, you can get the data you want by creating a *multiple-table query*. To build one, you can add all the tables you need to the Table pane when you first create the query, or you can add more tables to an existing query. If your data source includes more than one database (or the equivalent), you can use tables from different databases in the same query.

In this chapter, you'll learn:

- How multiple-table and single-table queries differ.
- What join lines are and how they're created.
- How joined tables affect query results.
- What to do if Microsoft Query doesn't automatically join tables.
- What to do if you can't join the tables you need.
- How to create different join types.

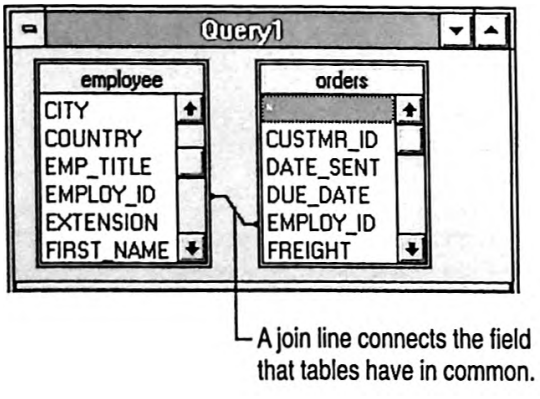
How Multiple-Table and Single-Table Queries Differ

When you use Microsoft Query to retrieve data from more than one table, the query you create differs in several ways from a query that uses only one table.

- **You can't change the data in a multiple-table query** If you add more than one table to the Table pane, you cannot make any changes to the data displayed in the result set. When you want to change or update the data in the underlying tables, you must use a single-table query. (For more information on changing your data, see Chapter 3, "Working with Data.")
- **In lists, field names are preceded by table names** In the Data pane, the Criteria pane, and many dialog boxes, you can enter a field name by selecting it in a drop-down list. When you add more than one table to the Table pane, the field names in these lists are preceded by the name of the table that the field is stored in and a period (for example, "employee.HIRE_DATE").

What Join Lines Are and How They're Created

To create a query that retrieves data from more than one table, you add the tables containing your data and make sure that they are connected or *joined* to each other in the Table pane. Tables (represented as field lists) are joined when a *join line* connects a field in the field list for one table to the equivalent field in the field list for the other table. For example, when the Employee and Orders tables are joined, a join line connects the EMPLOY_ID fields in the field lists of the two tables in the Table pane.



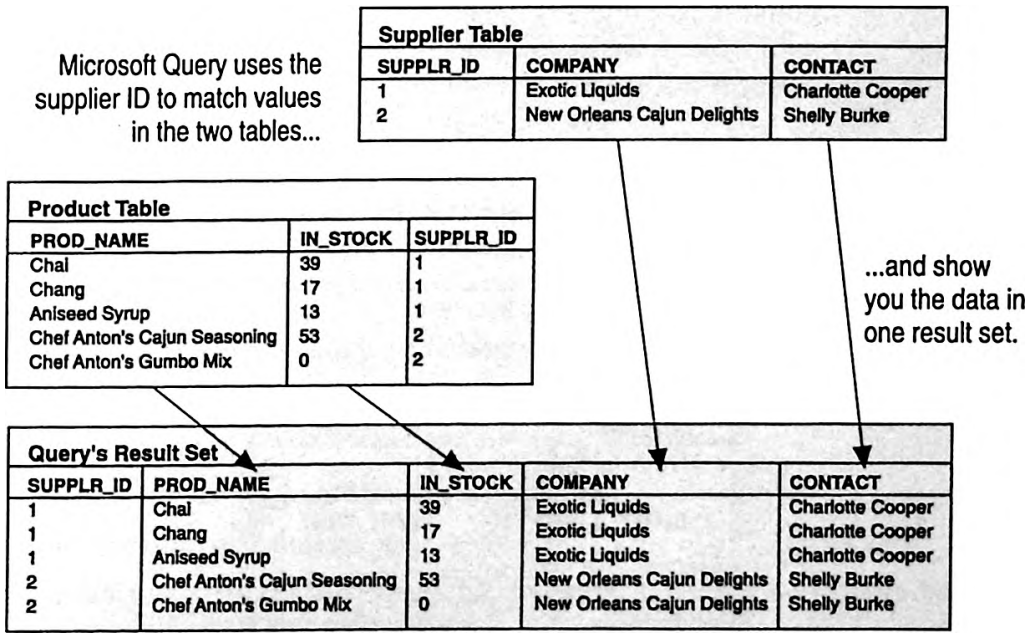
In some cases, Microsoft Query automatically joins tables as you add them to your query. It does this when one of the tables contains a *primary key field* and the other table includes a field of the same name and data type as the primary key field. A primary key field is a special kind of field whose values uniquely identify

each record or row stored in a table. For example, a field containing part numbers could serve as a primary key field to uniquely identify each part in your inventory.

Some data sources, such as dBASE data sources, don't support primary key fields. In this case, you must create the joins yourself. For more information about creating joins, see "If Microsoft Query Doesn't Automatically Join Tables" later in this chapter.

How Joined Tables Affect Query Results

When tables are joined, Microsoft Query knows how the sets of data in the two tables are related. For example, suppose you want to see product names and the number of units in stock from the Product table and company names and contact names from the Supplier table. Once these tables are joined, Microsoft Query can connect each product with its supplier. When you run the query, Microsoft Query combines the related records from the two tables and displays them in one result set.



When Microsoft Query joins tables automatically, it uses an *equi-join*, which means that the values in the joined fields must be *equal* for a record to be included in the result set. The equi-join that Microsoft Query uses is classified as an *inner join* (although in database terminology, it's common to just use the term "equi-join"). This type of join is also the default if you join the tables yourself.

Note You can create other types of joins, such as joins that retrieve all the records from one table and only matching records from the other table, or joins that compare values within a single table. For more information, see "Creating Outer Joins" and "Creating Self-Joins" later in this chapter. You can also create joins that don't compare values for equality. For example, you can compare values in one table to see if they are greater than or less than the values in another table. For more information, search Help for "creating joins."

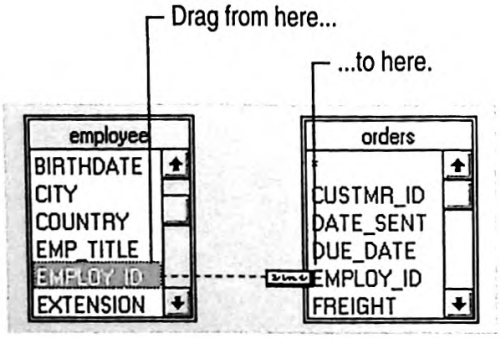
If your tables aren't joined, Microsoft Query doesn't know which records are associated with each other, so it connects all the records in one table with all the records in the other table. This means that if each table contains 10 records, the result set will contain 100 records. It also means that the query may take a long time to run and ultimately will produce less meaningful information.

If Microsoft Query Doesn't Automatically Join Tables

If your tables don't include primary key fields, Microsoft Query doesn't automatically join the tables for you; however, you can create the same type of join Microsoft Query creates (an equi-join). Typically, the fields you use to join two tables have the same name and contain the same type of data (such as dates, numbers, or text).

▶ **To create an equi-join by dragging**

- In the Table pane, select a field in the field list for one table and drag it to the equivalent field in the other field list.



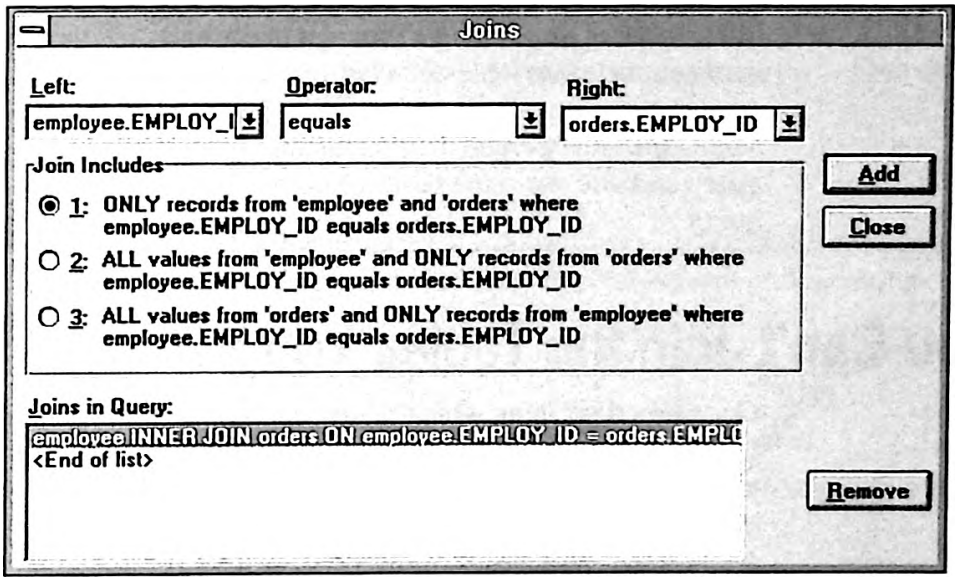
▷ To create an equi-join using the Joins dialog box

1. From the Table menu, choose Joins.

   Microsoft Query displays the Joins dialog box. The Left and Right drop-down list boxes both contain a list of all the fields for the tables in the Table pane. Each field name is preceded by the name of the table the field is stored in and a period (for example, "employee.HIRE_DATE").

2. In the Left drop-down list box, select the name of the table and field that will be on the left side of the join line.

3. In the Right drop-down list box, select the name of the table and field that will be on the right side of the join line.



4. Select the following default settings:

   Operator: equals

   Join Includes: 1

   These are the settings for an inner equi-join.

5. Choose the Add button.

   Microsoft Query displays the join statement in the Joins In Query box, identifying the join as an inner join.

6. Chose the Close button.

   A join line connects your tables in the Table pane.

▶ **To delete a join using the DEL key**

- Select the join line in the Table pane, and press the DEL key.

▶ **To delete a join using the Joins dialog box**

1. From the Table menu, choose Joins.
2. In the Joins In Query box, select the statement for the join you want to remove, and then choose the Remove button.

   Microsoft Query deletes the join line in the Table pane.
3. Choose the Close button.

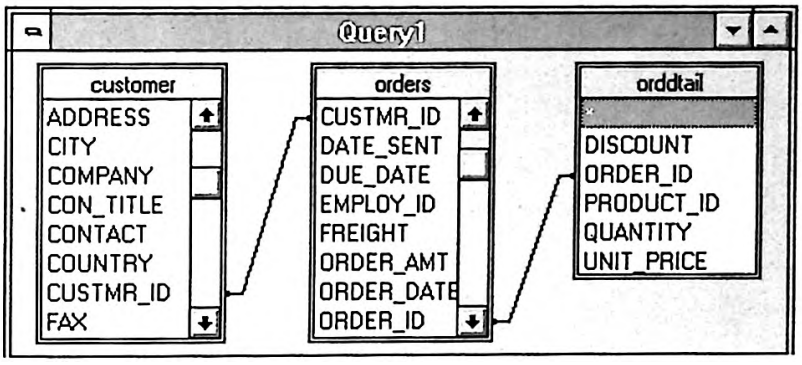
Note Adding or deleting a join in a query affects only that query—not joins between the same tables in other existing queries or joins that Microsoft Query creates automatically in new queries. For example, if you delete a join that Microsoft Query created automatically between two tables and then create a new query and add the same tables, Microsoft Query creates the join line in the new query.

If You Can't Join the Tables You Need

Once you determine which tables contain the data you want to retrieve, you add those tables to your query. If Microsoft Query doesn't automatically join the tables, you join them. In some cases, however, the two tables that contain the data you want to retrieve can't be joined directly. This happens when the tables don't contain the same primary key field, or they don't include any fields that are equivalent. In this situation, you have to add one or more extra tables to serve as a bridge between your tables in the Table pane. The new table contains fields that you or Microsoft Query can join to fields in the two tables containing the data you want to retrieve.

For example, suppose you want to create a query that uses fields from the Customer table and the OrdDtail table. When you add only these two tables to your query, you see that they don't have any equivalent fields. However, a third table—the Orders table—can act as a bridge between the other two tables because it has the CUSTMR_ID field in common with the Customer table and the

ORDER_ID field in common with the OrdDtail table. By including the Orders table in your query, you provide a connection between the other two tables.



By including the Orders table, you can indirectly join the Customer table and the OrdDtail table.

Creating a Join Diagram

To help you decide which tables to add to your query, you can use Microsoft Query to create a diagram of all the tables in the data source and the connections between them.

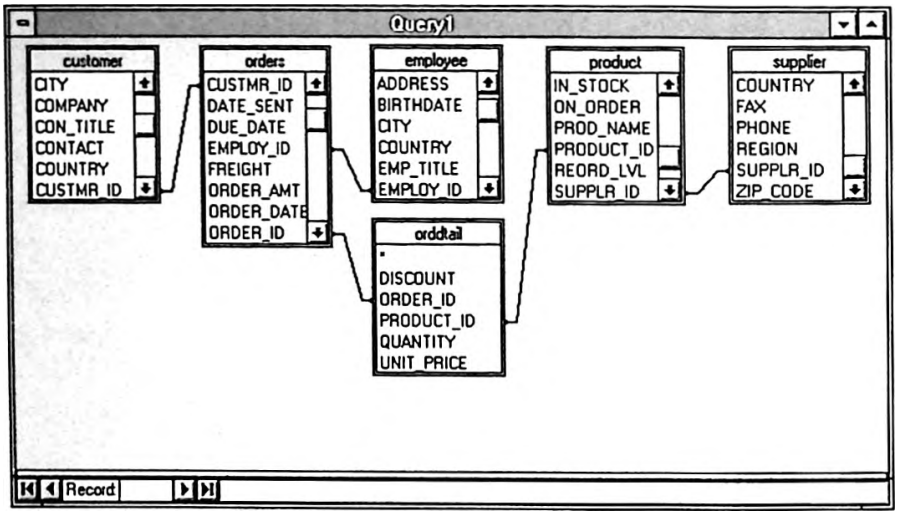
▷ To create a join diagram

1. Create a query and, using the split bar, enlarge the Table pane.
2. Add all the tables from the data source (and database, if applicable), and then arrange them so the joins are clearly visible.

   If Microsoft Query doesn't join the tables automatically, create the joins between equivalent fields yourself. (For more information, see "If Microsoft Query Doesn't Automatically Join Tables" earlier in this chapter.)

You can view the diagram on screen by maximizing the Query window, or you can print the diagram. Check your Windows or Macintosh documentation for information on how to copy an entire screen using the PRINT SCREEN key or any other method available on your computer, and how to print the information copied from the screen using another application, such as Microsoft Paintbrush™.

The following join diagram shows the joins between all the tables in the Northwind sample data. (If you want to create this diagram, you must join the tables yourself because this data is in dBASE format.)



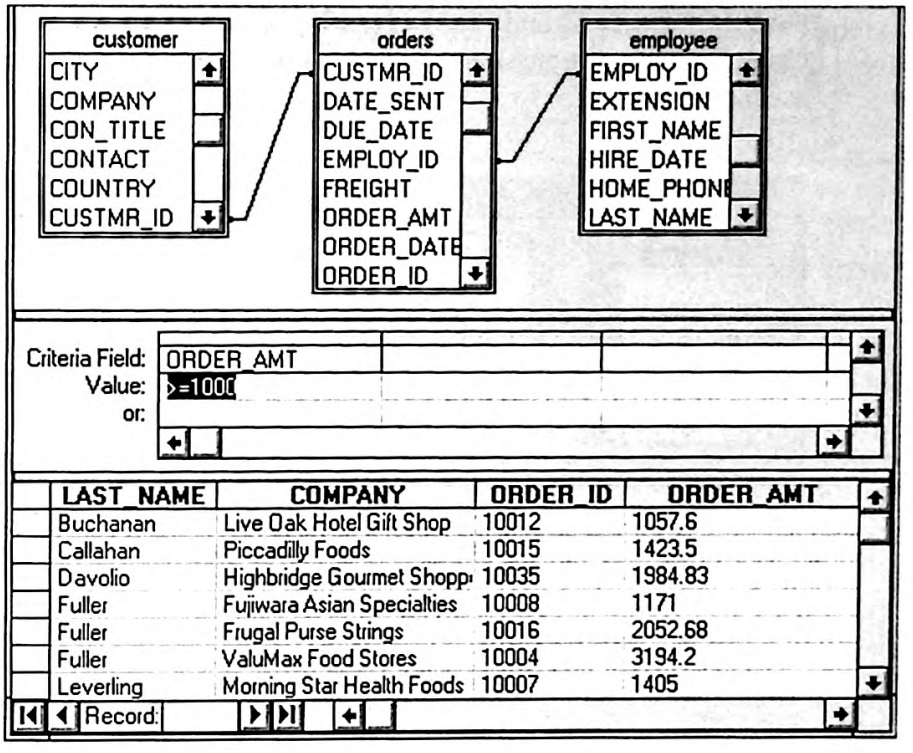
Example

Creating a Query That Contains Three Tables

Suppose you want to review information on orders for $1,000 or more to find out for each order which employee made the sale and which customer placed the order. The fields you need are in the Customer, Orders, and Employee tables.

Create a query and add the three tables. Join the fields as indicated in the following illustration, and add these fields to the Data pane: the LAST_NAME field from the Employee table, the COMPANY field from the Customer table, and the ORDER_ID and ORDER_AMT fields from the Orders table. Display the

Criteria pane, and enter the criteria as shown. Sort the employees' last names in ascending order.



The result set displays the information you wanted: Now at a glance you can see which employees made a sale of $1000 or more to which customers and how much each sale was worth.

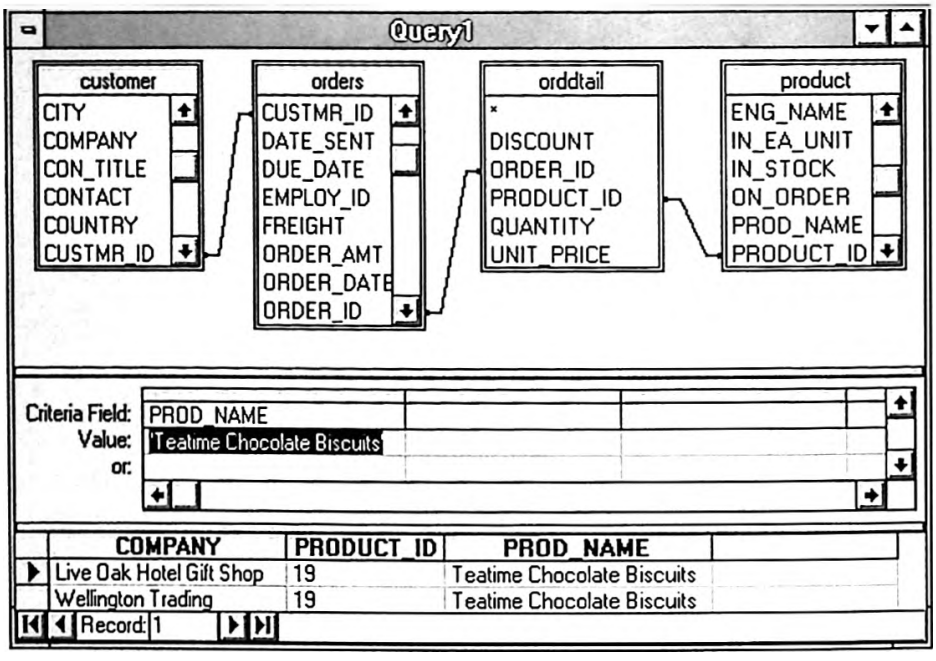
Example

Creating a Query That Uses Four Tables but Displays Records from Only Two Tables

Suppose you want to find out which Northwind customers ordered Teatime Chocolate Biscuits. The information you need is in the Customer and Product tables, but these tables don't share a common field. However, you can add the Orders and OrdDtail tables to create a bridge between the two unrelated tables.

Create a new query, and add the tables in this order: Customer, Orders, OrdDtail, and Product. Join the fields as indicated in the following illustration, and then add these fields to the Data pane: the COMPANY field from the Customer table and

the PRODUCT_ID and PROD_NAME fields from the Product table. Display the Criteria pane and enter the criteria as shown. Sort the company names in ascending order.



Microsoft Query brings together data from different tables to show which customers have purchased the biscuits.

Creating Other Types of Joins

In Microsoft Query, you can use other types of joins besides inner joins. Two types of joins that you might want to create are outer joins and self-joins.

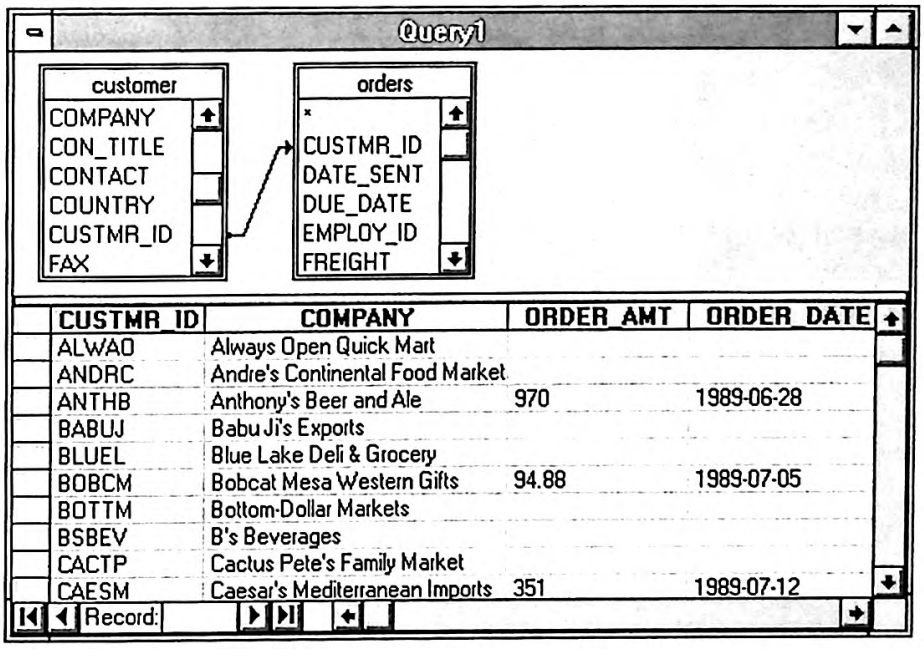
Creating Outer Joins

Suppose you want to see all your customers and their order information, including customers whose order information hasn't been entered in the table. You do this with an *outer join* (another type of equi-join), which retrieves all the records from one table (in this example, the Customer table) and only those records from the other table (the Orders table) for which values in the joined fields are equal. Each matching record from the two tables is combined into one record in the result set. When a record from the Customer table can't be matched with one from the Orders table, Microsoft Query displays the data in the record from the Customer

table and empty cells in place of data in the record from the Orders table. This enables you to see the customers whose order information still needs to be entered in the underlying table.

Note You can't use an outer join in a query with more than two tables.

You can create a new join as an outer join, or you can change an existing inner join to an outer join. The advantage of using an outer join is that it enables you to find information that isn't included in the result set from a query using the default inner join, because an inner join retrieves only records from both tables that have matching values in the joined fields. If the tables in the example were connected by an inner join, the query would retrieve only the records for customers whose order information *had* been entered in the table. Customers whose order information was missing wouldn't be displayed in the result set.



By using an outer join, you can see that order information for a number of customers still hasn't been entered into the underlying table.

▶ To create an outer join

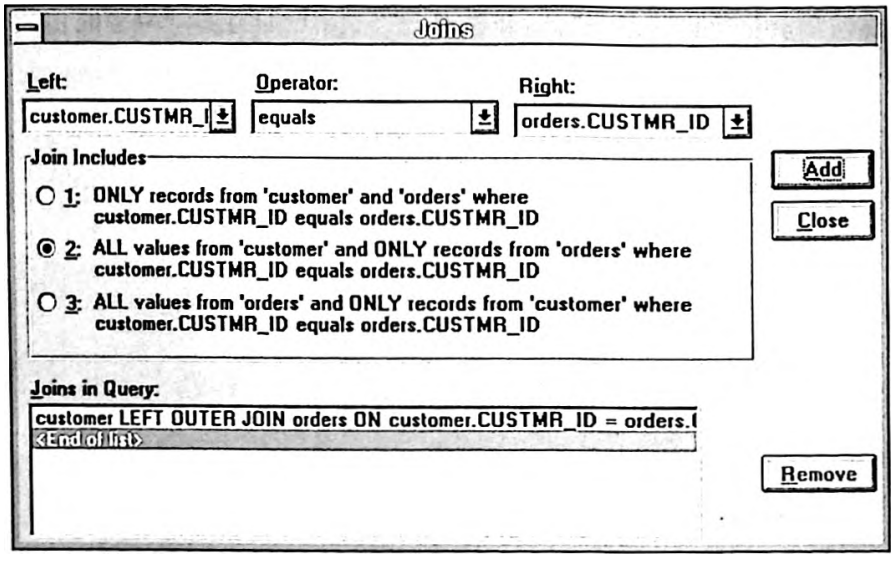
1. Create a query, adding the two tables you want to join, and choose Joins from the Table menu.

   -Or-

   To change an existing inner join to an outer join, open the query and double-click the join line in the Table pane.

   Microsoft Query displays the Joins dialog box.

2. In the Left drop-down list box, select the name of the table and field that will be on the left side of the join line.
3. In the Right drop-down list box, select the name of the table and field that will be on the right side of the join line.



4. In the Joins Includes section, select option 2 or 3 depending on which records you want to include.

   For example, if you select option 2 for a query that includes the Customer table and Orders table, the result set displays all the records from the Customer table and only those records from the Orders table in which the joined fields are equal. If you choose option 3 for the same query, the result set displays all the records from the Orders table and only those records from the Customer table in which the joined fields are equal.

5. Choose the Add button.

   Microsoft Query displays the join statement in the Joins In Query box.

6. Choose the Close button.

The tables are joined by a join line with an arrowhead. The arrowhead points to the table contributing only the matching records (or blank cells if no matching records are found). The other table contributes all its records.

Creating Self-Joins

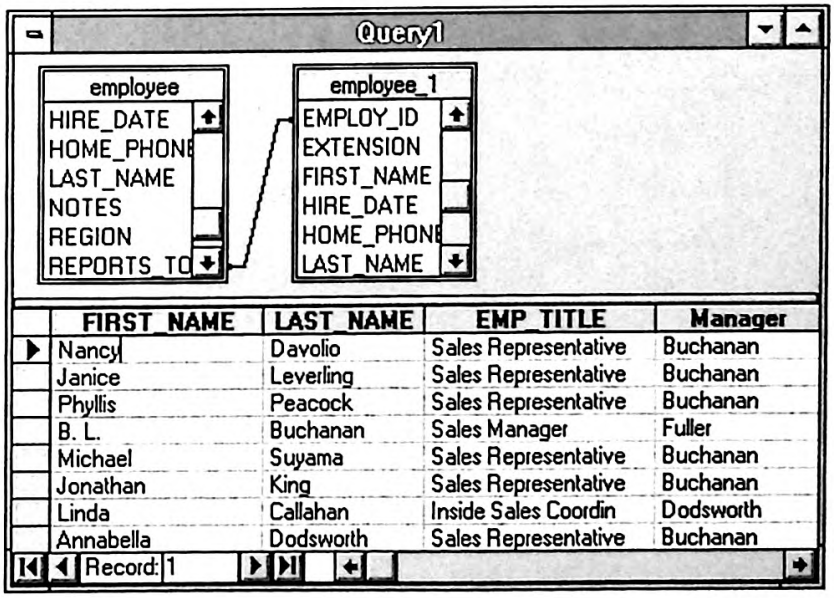
If you want to compare values within a single table, you use a *self-join*. You do this by adding two copies of the same table to a query and joining them. For example, you can add two copies of the Employee table to find out which manager each employee reports to.

If you use just one copy of the Employee table and add the REPORTS_TO field to the Data pane, the result set includes only the employee ID of each manager, not his or her name. If you use two copies of the same table and join the REPORTS_TO field to the EMPLOY_ID field, Microsoft Query compares the data between the fields and determines which name belongs with the employee ID in the REPORTS_TO field.

Example

Creating a Self-Join

Create a query, and add the Employee table twice. (Microsoft Query names the second table "Employee_1" to distinguish the second copy of the table from the first.) Join the REPORTS_TO field in the left table to the EMPLOY_ID field in the right table. From the left table, add the following fields to the Data pane: FIRST_NAME, LAST_NAME, and EMP_TITLE. From the right table, add the LAST_NAME field, and using the Edit Column dialog box, change column heading to "Manager."



In this query, you've told Microsoft Query to combine each employee's record in the first table with the record of the employee from the second table whose ID is in the REPORTS_TO field. Because you added the LAST_NAME field from the second table, Microsoft Query finds the last name of the person whose employee ID is the same as the ID stored in the REPORTS_TO field in the record from the first table.

CHAPTER 7

Creating and Deleting Tables

What if you want to add data about a new topic? For example, you may already have data about suppliers, but now you want to add data about customers.

You can use Microsoft Query to create a new, empty table to store data about a specific topic. If you want, you can use an existing table as a template for the new table. Or, if you already have data for your new table in the result set of a query, you can save that data as your new table.

Note Once a table is created, you can't change it except to add an index on one or more fields. If you want information about what an index is and how to create one for a table, search Help for "creating indexes."

In this chapter, you'll learn how to:

- Create a new table.
- Delete a table.
- Save the result set of a query as a table.

Creating a New Table

You create a new, empty table by adding the fields you want. But before you begin creating your table, you have to decide what those fields should be. Ask yourself, "What kind of information do I want to keep track of?" For example, to decide which fields to include in a suppliers table, ask yourself, "What information about suppliers do I want to keep track of?" You'll add a field for each type of information you think of.

More Information For a description of tables, fields, and records, see "Terms You Should Know Before You Begin" in Chapter 1, "Getting Started with Queries."

The Supplier table in the Northwind Traders sample data includes the following fields.

Field list for the Supplier table

If you already have a table that's similar to the table you want to create, you can use it as a template for your new table. However, if none of your existing tables is similar to the table you have in mind, it's easier to create your new table from scratch.

▶ **To create a new table**

1. From the File menu, choose Table Definition.

   Microsoft Query displays the Select Data Source dialog box, which lists the data sources you can use for your table.

   When you select a data source, you're telling Microsoft Query:

   - Where to create the new table.
   - What format the data in the table will have.

For example, if you select the NWind data source, Microsoft Query creates your new table as a dBASE file in the same location as the other files in the NWind data source.

Note If the data source you want isn't listed, choose the Other button. In the ODBC Data Sources dialog box, select the data source you want, and choose the OK button. Microsoft Query may prompt you for additional information, such as a user ID, password, database, and directory or folder. Once you provide this information, Microsoft Query adds your data source to the list in the Select Data Source dialog box. You can then proceed to Step 2.

If the data source you want to use isn't listed in the ODBC Data Sources dialog box, use the New button to define new data sources for drivers that are already installed on your machine. For more information, see Appendix B, "ODBC Drivers: Requirements, Installation, and Adding Data Sources."

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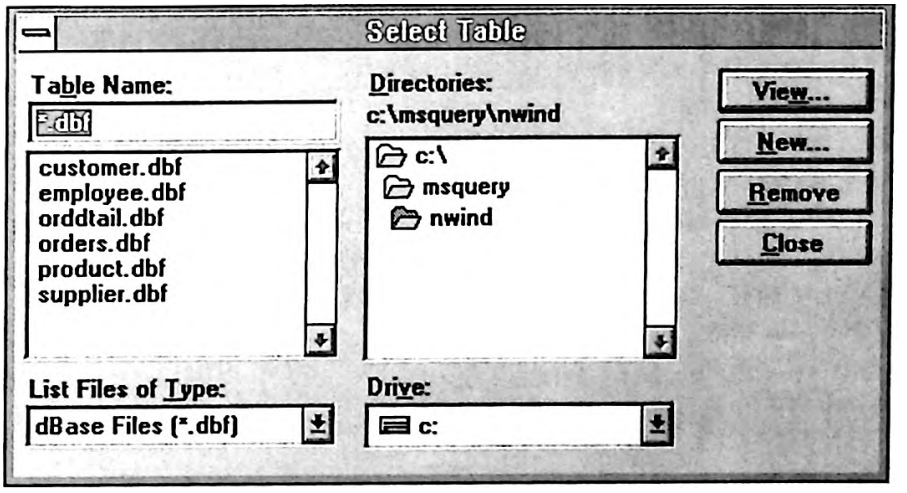
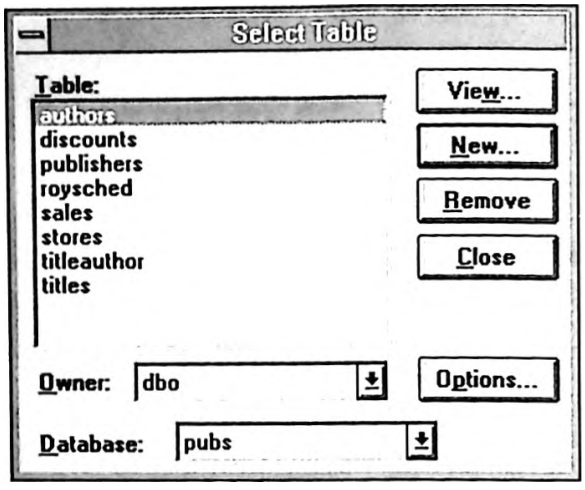
2. Select the data source you want, and then choose the Use button.

   Microsoft Query displays the Select Table dialog box that's appropriate for your data source. If your data source stores data in files (as do Microsoft Excel and Microsoft Word), you'll see the following Select Table dialog box in Microsoft Query for Windows. (Microsoft Query for the Macintosh displays a comparable dialog box.)



If your data source stores data in tables (as do SQL Server and Microsoft Access), you'll see the following Select Table dialog box. (Microsoft Query for the Macintosh displays a comparable dialog box.)

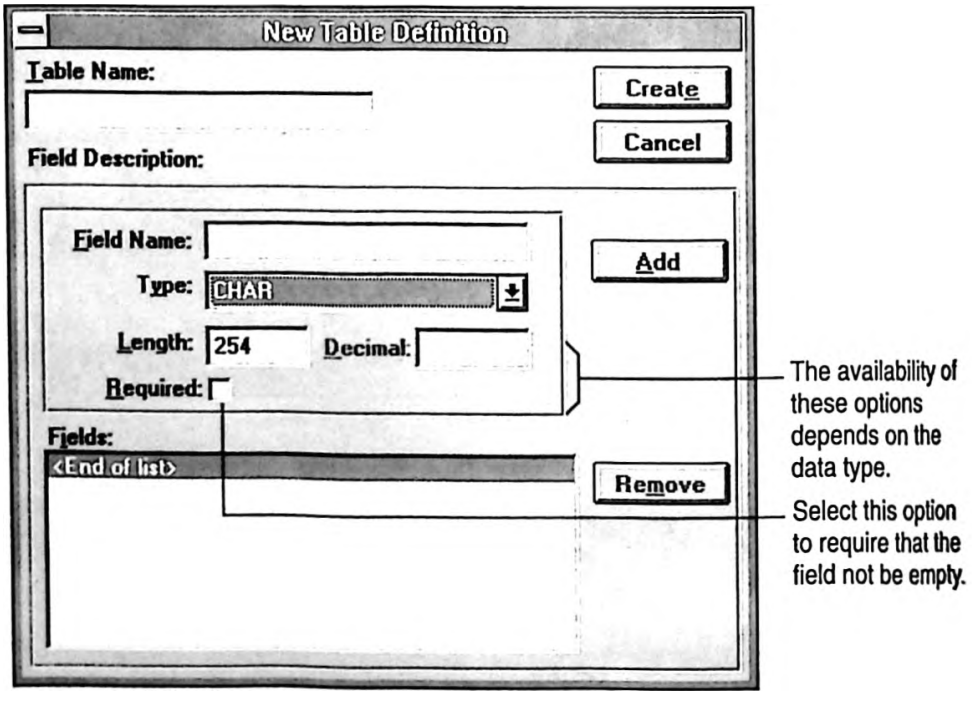


3. If you want to create a table from scratch, choose the New button.

   –Or–

   If you want to use an existing table as the template for your new table, select the table you want to serve as the template, and then choose the View button.

   Microsoft Query displays the New Table Definition dialog box (if you've chosen the New button) and the View Table Definition dialog box (if you've chosen the View button).



Note If you choose the View button, Microsoft Query displays the View Table Definition dialog box instead of the dialog box shown in the preceding illustration. The View Table Definition dialog box includes information about each field in the table you're using as a template. If you don't want to include one or more of these fields in your new table, select the field in the Fields box and choose the Remove button.

4. In the Table Name box, type a name for your new table. If you're using an existing table as a template, replace the existing table name with the name you want for your new table.

Note The number and type of characters allowed in the table name vary, depending upon your data source. For more information, see the documentation that came with the driver your data source uses, or contact the driver vendor. (If your data source uses an ODBC driver that came with Microsoft Query for Windows, click "ODBC Drivers" in the Microsoft Query Help Contents, and then click the name of the driver.)

Next, you'll add the fields you want in your new table.

5. In the Field Name box, type a name for the field.

   The field name identifies the data stored in a field. For example, you might use the name "SupplierID" for a field that contains supplier identification numbers.

6. In the Type box, click the arrow to display a list of data types, and select the data type you want from the list.

   The data type defines the type and range of values you can enter into a field. For example, you may not be allowed to enter text into a Currency field.

Note The available data types depend on your data source. For more information, see the documentation that came with the driver your data source uses, or contact the driver vendor. (If your data source uses an ODBC driver that came with Microsoft Query for Windows, click "ODBC Drivers" in the Microsoft Query Help Contents, and then click the name of the driver.)

7. If you want, specify additional information for the field, such as how many characters the field can contain and whether or not the field requires data. The available options depend on the field's data type.

   - **Length** Microsoft Query displays the maximum number of characters for the data type you selected, including decimal places. If you know that you won't need that many characters, you may be able to save disk space by

entering a smaller number. For example, if the postal codes you want to enter all contain five characters, you can specify a length of 5. Limiting field size also helps prevent data-entry errors.

- **Decimal** Type the number of decimal places you want to display.
- **Required** Select this option if you want to require that the field contain data. A field that requires data can never be empty.

8. When you've finished, choose the Add button.

   Microsoft Query adds the field to the Fields box in the lower part of the dialog box and displays the options you selected beside the field's name.

9. Repeat Steps 5 through 8 for each field you want to add to your table.

Note Once you've added a new field by choosing the Add button, you can't change the options you selected. If you have to make changes to a field, remove it and then add it again with the changes you want. You remove a field by selecting it in the Fields box, and then choosing the Remove button.

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10. When you've finished adding fields, choose the Create button.

    Microsoft Query creates the new table in the location specified by your data source and displays a message confirming that the table was successfully created.

11. In the dialog box, choose the OK button.
12. In the Select Table dialog box, choose the Close button.

After you create a table, you can add data to it. For information on adding data, see Chapter 3, "Working with Data."

Deleting a Table

If you decide you no longer want a table, you can delete it.

Warning When you delete a table, you're also deleting all the data stored in the table. After you've deleted a table and its data, you can't undo your deletion.

▶ **To delete a table**

1. From the File menu, choose Table Definition.

   Microsoft Query displays the Select Data Source dialog box, in which you select the data source for the table you want to delete.

Note If the data source you want isn't listed, see "Creating a New Table" earlier in this chapter for instructions on how to make the data source available.

2. Select the data source that contains the table you want to delete, and then choose the Use button.

   Microsoft Query displays the Select Table dialog box that's appropriate for your data source.

3. Select the table you want to delete, and then choose the Remove button.

   Microsoft Query displays a message asking you to confirm the deletion. If you choose the Yes button, Microsoft Query deletes the table and the data in it. Then it displays another message saying that the table was successfully deleted.

4. In this dialog box, choose the OK button.
5. In the Select Table dialog box, choose the Close button.

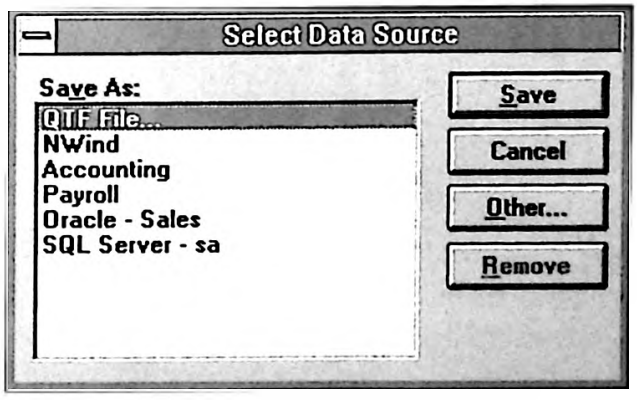
Saving a Query's Result Set as a Table

If you have the data for a new table in the result set of a query, you can save the data as a new table. Microsoft Query creates a new table containing the data from your query's result set.

▷ **To save the result set of a query as a new table**

1. Open the query containing the result set you want to save as a table.
2. From the File menu, choose Save As.

   Microsoft Query displays the Select Data Source dialog box, in which you select the data source for your new table.



When you select a data source, you're telling Microsoft Query:

- Where to create the new table.
- What format the data in the table will have.

For example, if you select the NWind data source, Microsoft Query creates your new table as a dBASE file in the same location as the other files in the NWind data source.

Note If the data source you want isn't listed, see "Creating a New Table" earlier in this chapter for instructions on how to make the data source available.

---

3. Select the data source you want, and then choose the Save button.

   Microsoft Query displays the Save As dialog box.

4. Type a name for your new table, and choose the drive and directory or folder where you want to store it.

5. In Microsoft Query for Windows, choose the OK button.

   In Microsoft Query for the Macintosh, choose the Save button.

Note Microsoft Query may ask if you want to create an index for your table. For more information about what an index is and how to create one for the table, search Help for "creating indexes."

Microsoft Query creates a new table containing the data from your query's result set. The data in this table is not linked to the query, so if the data in the query changes, the data in the new table doesn't change.

CHAPTER 8

Working with SQL

Structured Query Language (SQL) is a language used for retrieving, updating, and managing data. When you create a query in the Query window, Microsoft Query uses SQL to build the corresponding SQL SELECT statement behind the scenes. For those of you who are familiar with SQL, Microsoft Query provides the SQL dialog box, in which you can view or edit the statement. If you edit the statement, you can see the effects in the Query window.

There are some kinds of queries, however, that you can't create in the Query window, such as those that grant privileges, modify existing tables, or create indexes on data. For these and more advanced types of queries, Microsoft Query provides the Execute SQL dialog box, in which you can execute a custom SQL statement. You can also use this dialog box to execute certain procedures that your data source contains.

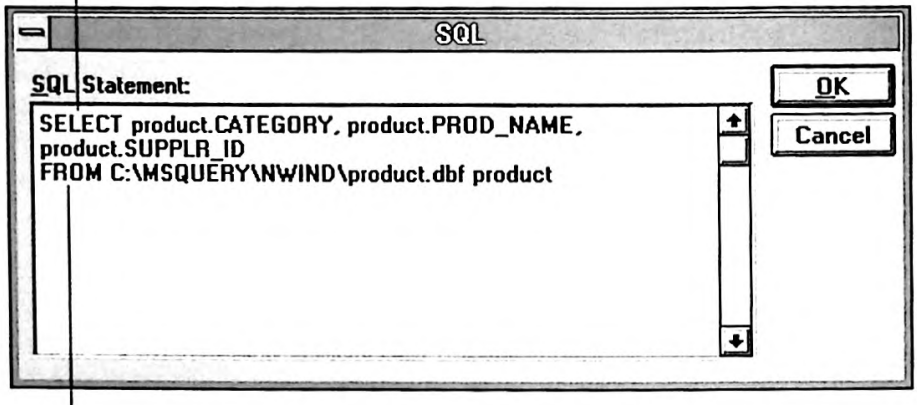
In this chapter, you'll learn how:

- Microsoft Query builds an SQL SELECT statement.
- To view or edit an existing query's SQL SELECT statement.
- To create a query using a custom SQL statement.
- To execute procedures.

How Microsoft Query Builds an SQL SELECT Statement

When you create a query in the Query window, Microsoft Query builds the corresponding SQL SELECT statement behind the scenes. In a simple query, the SQL SELECT statement includes a Select list, which identifies the columns (fields) you want to retrieve data from and a FROM clause, which specifies the name and location of the tables containing the columns. When you add tables to the Table pane, Microsoft Query composes the FROM clause. When you add fields to the Data pane, it composes the Select list.

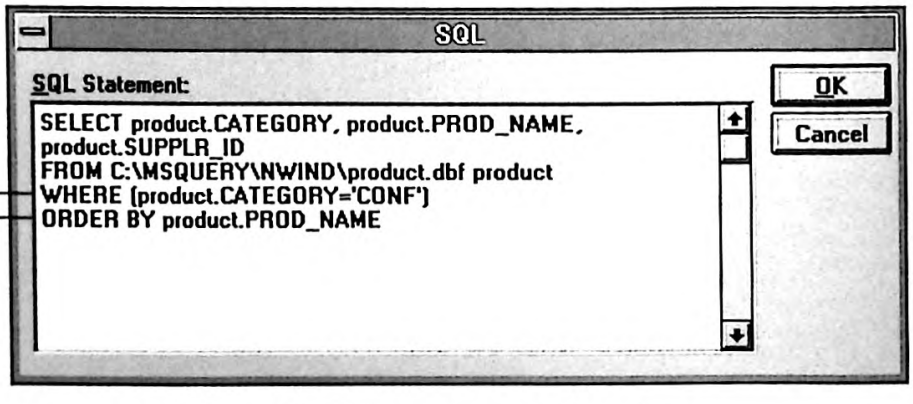
When you add fields to the Data pane, Microsoft Query adds the Select list to the SQL statement.



When you add tables to the Table pane, Microsoft Query adds the FROM clause.

When you add other features to your query, such as a sort order or criteria that data must meet to be included in the result set, other clauses are added to the SELECT statement.

When you add criteria, Microsoft Query adds a WHERE clause to the SELECT statement.



When you sort on a column, Microsoft Query adds an ORDER BY clause.

The following table explains how the actions you take when designing a query affect the underlying SQL statement.

If you do this	You affect this part of the statement
Add fields to or remove fields (including calculated fields) from the Data pane	Select list (the list of columns to retrieve data from)
Add tables to or remove tables from the Table pane	FROM clause
Join tables using the default equi-join	WHERE clause
Join tables and change the default equi-join to an outer join	OUTER JOIN (LEFT or RIGHT) clause
Add, remove, or change criteria	WHERE clause
Add two or more criteria that must all be true for records in the result set	AND keyword
Add two or more criteria, any one of which must be true for records in the result set	OR keyword
Select Unique Values Only in the Query Properties dialog box	DISTINCT keyword
Add or delete a sort order for a column	ORDER BY clause
In the Data pane, include fields (without totals) that Microsoft Query automatically uses for grouping fields that contain calculated totals	GROUP BY clause
Add, remove, or change criteria involving a calculated field (including a totaled field) or a field that isn't in the result set of a query that contains totals	WHERE clause
Add, remove, or change criteria involving an untotaled field in the result set of a query that contains totals	HAVING clause

Viewing or Editing an Existing Query's SQL SELECT Statement

After you create a query in the Query window, you can look at its corresponding SQL SELECT statement in the SQL dialog box. If you prefer, you can modify the query's design by changing the SQL statement there instead of making the equivalent changes in the Query window. For example, you can add a field to the Data pane by typing the field's name in the SELECT statement directly.

You can also use a query's SQL SELECT statement as the basis for a more complex query that you can't create directly in the Query window. For example, you can embed a sub-SELECT statement (also known as a subquery) into an existing query's SELECT statement. The result of the sub-SELECT statement determines what the main SELECT statement returns.

When you change or replace the SQL statement, you can use the same SQL syntax Microsoft Query uses or the syntax your data source supports. (For more information, see the SQL documentation for your data source.) Microsoft Query tries to interpret the syntax you use and display both the query's design and result set in the Query window.

Note To view or modify an existing SQL statement that returns a result set, choose SQL from the View menu or click the View SQL button. To execute a new SQL statement or an SQL statement that doesn't return a result set, choose Execute SQL from the File menu. (For more information, see "Creating a Query Using a Custom SQL Statement" later in this chapter.)

If Microsoft Query can't display the query's design (because it can't interpret the syntax you used), it still displays the result set. However, the only modifications you can make to the result set in the Query window are formatting modifications (such as changing the display font or column width). To make any changes to the query definition (such as adding or removing fields, changing conditions, or editing data), you must use the SQL dialog box.

▶ **To view or edit the SQL SELECT statement of a query you create in the Query window**

1. Create a new query, adding the tables and fields you want, or open an existing query.

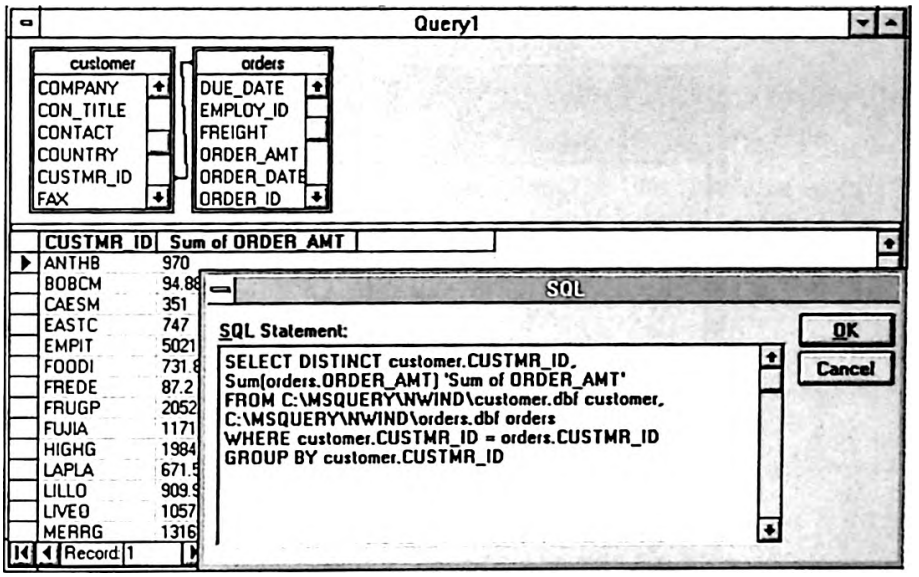
View SQL button

2. Click the View SQL button on the toolbar.

   -Or-

   From the View menu, choose SQL.

   Microsoft Query displays the SQL dialog box with the SQL SELECT statement that corresponds to the active query.



3. If you want to make changes, type them in the SQL Statement box, and then choose the OK button.

Tip To add a new line in the SQL Statement box, press CTRL+ENTER in Microsoft Query for Windows or CONTROL+ENTER in Microsoft Query for the Macintosh.

Microsoft Query executes the SQL statement and displays the result set in the Data pane.

If the query isn't executed successfully, Microsoft Query displays an SQL error message that identifies the problem. Click the OK button to return to the SQL dialog box, and correct the statement.

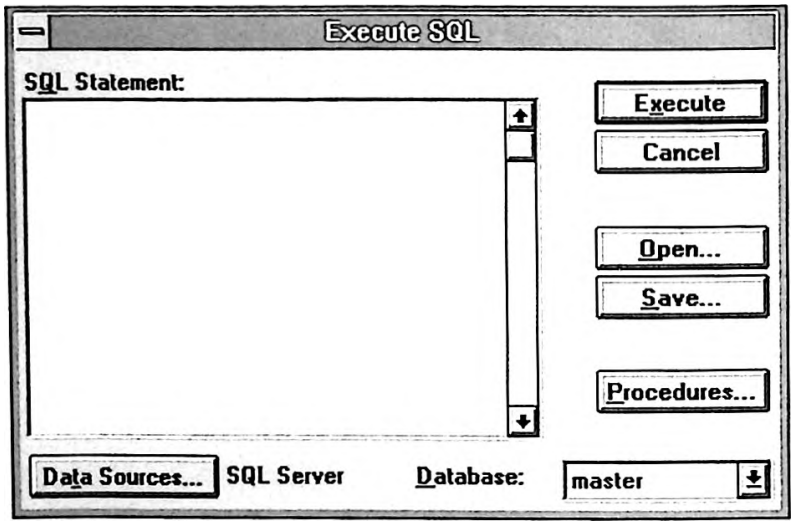
Creating a Query Using a Custom SQL Statement

There are some types of queries that you can't create in the Query window, such as queries that grant privileges, modify existing tables, or create indexes on data. However, you can still have Microsoft Query retrieve the data you want by using the Execute SQL dialog box to define and execute a custom SQL statement.

▶ To execute a new or existing custom SQL statement

1. From the File menu, choose Execute SQL.

   Microsoft Query displays the Execute SQL dialog box. The last data source you specified in this dialog box during the current working session is listed next to the Data Sources button in the lower-left corner. If you haven't previously specified a data source, the words "no data" appear next to the button.



If you want to use a different data source or database for the query, you have to do one of the following before you type the SQL statement you want to execute:

- To execute an SQL statement on a table in another data source, choose the Data Sources button. In the Select Data Source dialog box, select the data source in the Available Data Sources list, and then choose the Use button; or choose the Other button to make a different data source available.

  For more information on making data sources available, see "Selecting Data Sources" in Chapter 1, "Getting Started with Queries." For more information on adding new data sources, see Appendix B, "ODBC Drivers: Requirements, Installation, and Adding Data Sources."

- To change the database, select a name in the Database list. (If your data source doesn't use the term "database," the box displays the label that's appropriate to your data source.)

2. In the SQL Statement box, type the SQL statement you want to execute.

   –Or–

   Choose the Open button, select the file that contains the SQL statement you want to execute, and then choose the OK button in Microsoft Query for Windows or the Open button in Microsoft Query for the Macintosh.

3. Choose the Execute button to run the query.

   Microsoft Query does one of the following:

   - If the query returns one or more result sets, Microsoft Query displays only the first one in the Data pane and doesn't display the others.
   - If the query is successful but isn't the type that returns a result set, Microsoft Query displays a message saying the statement was executed successfully. If the query affected rows (records) in the underlying table, the message also specifies how many rows were affected.
   - If the query isn't executed successfully, Microsoft Query displays an SQL error message that identifies the problem. Click the OK button to return to the Execute SQL dialog box, and correct the statement.

▷ **To save an SQL statement**

1. In the Execute SQL dialog box, choose the Save button.

   Microsoft Query displays the Save As dialog box.

   When you save an SQL statement for the first time, Microsoft Query prompts you to name the statement.

2. Type a name, and choose the drive and directory or folder where you want to store the query file.

3. In Microsoft Query for Windows, choose the OK button.

   In Microsoft Query for the Macintosh, choose the Save button.

Executing Procedures

A *procedure* is a series of commands that are stored on a server and that perform a specific operation, such as returning a result set, updating data tables, or updating system tables used for database administration. If your data source contains procedures, you can display a list of those procedures in Microsoft Query. You can then select the procedure you want to execute and paste it into the Execute SQL dialog box.

Note Microsoft Query can execute most procedures whether or not they return a result set. However, Microsoft Query doesn't execute procedures that have output arguments and doesn't show a return value from a function.

▶ To execute a procedure

1. From the File menu, choose Execute SQL.

   Microsoft Query displays the Execute SQL dialog box. The last data source you specified in this dialog box during the current working session is listed next to the Data Sources button in the lower-left corner. If you haven't previously specified a data source, the words "no data" appear next to the button.

   - If the procedure you want is in a different data source, choose the Data Sources button. In the Select Data Source dialog box, select the data source in the Available Data Sources list, and then choose the Use button; or choose the Other button to make a different data source available.

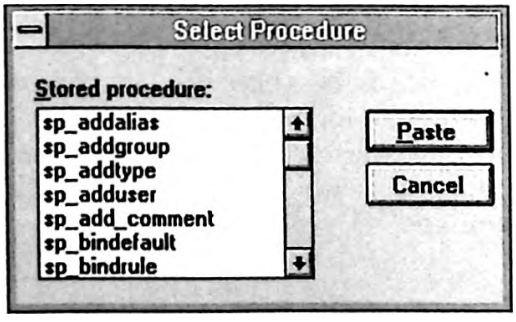
     For more information on making data sources available, see "Selecting Data Sources" in Chapter 1, "Getting Started with Queries." For information on adding data sources, see Appendix B, "ODBC Drivers: Requirements, Installation, and Adding Data Sources."

   - You can select the database you want to use in the Execute SQL dialog box. (If your data source doesn't use the term "database," the box displays the label that's appropriate to your data source.)

2. Choose the Procedures button.

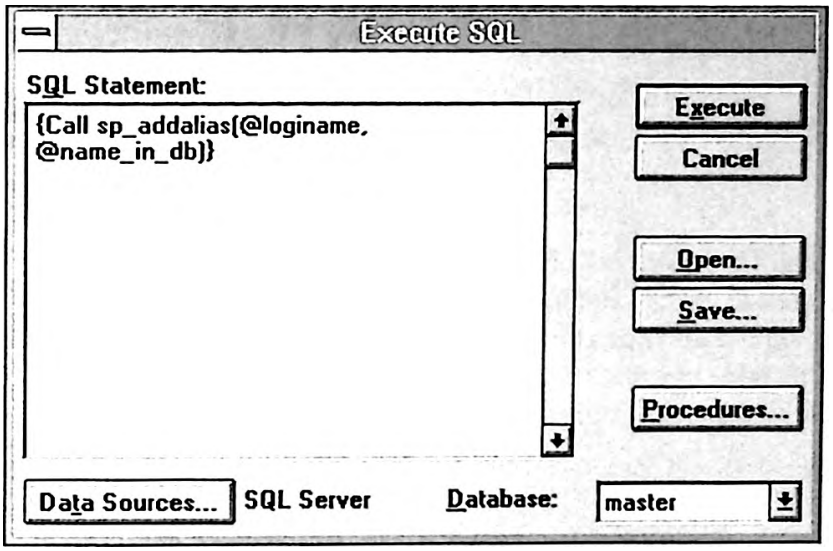
   Note If the data source doesn't support procedures, the Procedures button isn't available in this dialog box.

   Microsoft Query displays the Select Procedure dialog box, which lists the procedures available in the current data source.



3. Select the procedure you want to execute, and then choose the Paste button (or double-click the procedure).

   Microsoft Query pastes the procedure statement into the SQL Statement box. If the box already contains text, Microsoft Query replaces the text with the procedure statement.



   If the procedure has input arguments, the names of those arguments are enclosed in parentheses. Replace the argument names with the values you want to pass to the procedure.

4. Choose the Execute button.

   Microsoft Query does one of the following:

   - If the procedure returns a result set, Microsoft Query displays it in the Data pane. (If the procedure returns more than one result set, Microsoft Query displays only the first one in the Data pane and doesn't display the others.)
   - If the procedure is successful but isn't the type that returns a result set, Microsoft Query displays a message saying it was executed successfully.
   - If the procedure isn't executed successfully, Microsoft Query displays an error message from the data source to help identify the problem. Click the OK button to return to the Execute SQL dialog box, and correct the statement.

CHAPTER 9

Using Dynamic Data Exchange with Microsoft Query

Microsoft Query for Windows and Microsoft Query for the Macintosh (running System 7 or later) support *dynamic data exchange* (DDE), a mechanism that enables two applications to exchange data with each other. You can use DDE in macro and programming languages to communicate and send data back and forth between Microsoft Query and another application, such as Microsoft Excel.

In this chapter, you'll learn how to:

- Open a DDE channel.
- Execute DDE commands.
- Request status and other information.
- Fetch data.
- Exit Microsoft Query using DDE.
- Close a DDE channel.
- Use Microsoft Query with other applications.

For detailed information on the DDE commands you can use to communicate with Microsoft Query for Windows and Microsoft Query for the Macintosh, search Help for "DDE commands."

Using DDE

Two applications exchange information by engaging in a *DDE conversation* on a *DDE channel.* An application can conduct more than one conversation with Microsoft Query, but each conversation occurs on a different channel.

The application that initiates the conversation is called the *destination application;* the application that responds to the destination application is called the *source application.* Microsoft Query is always the source application in a DDE conversation. This means that other applications are always the ones to initiate a DDE conversation with Microsoft Query.

Note Not all applications support DDE. To find out if your application does, consult your application's documentation.

DDE Channels

There are two types of DDE channels:

- System channels
- Query channels

You use a *system channel* in a DDE conversation between the destination application and Microsoft Query to get general and query-related information. In addition to providing information about queries, the system channel also enables you to retrieve information about the system, such as the current connections, open queries, and the status of the destination application. For additional information about items you can request on the system channel, see "Requesting Information" later in this chapter.

You use a *query channel* in a DDE conversation between the destination application and a specific query (for example, Query1) in Microsoft Query. To use a query channel, the Query window must have already been opened using a system channel.

How DDE Works

You can compare a DDE conversation to a typical conversation between two people. For example, in a job interview, the interviewer may ask the applicant a series of interview questions. The interviewer (the destination) initiates and requests information from the applicant (the source) and records the information

on a piece of paper (the spreadsheet or document). Of course, the applicant can also ask questions of the interviewer and establish a two-way conversation.

Similarly, the participating applications in a DDE conversation pass information back and forth. For example, to use DDE to communicate with Microsoft Query, a macro or program might perform these steps:

1. The macro or program opens a channel using an Initiate statement or function. (This statement varies, depending on the macro or programming language used.)
2. Optionally, the macro or program sends information, such as what the available data sources or current connections are, to Microsoft Query.
3. The macro or program activates Microsoft Query. This step enables Microsoft Query to accept commands. At this point, either the user or the destination application can build or modify a query. The application can send commands directly to Microsoft Query using an Execute command.
4. After the user, macro, or program exits Microsoft Query, control returns to the destination application. The macro or program can retrieve query data and send it back to the destination application using a Request statement or function, or it can send data to Microsoft Query.
5. The macro or program closes the channel using a Terminate statement or function.

DDE Statements

Initiate, Request, Execute, and Terminate statements differ across applications. The following table illustrates equivalent DDE statements in Microsoft Excel, Microsoft Word, and Microsoft Visual Basic™.

Microsoft Excel	Microsoft Word	Visual Basic
INITIATE	**DDEInitiate**	LinkMode = Hot LinkMode = Manual LinkMode = Notify
REQUEST	**DDERequest**	**LinkRequest** method
EXECUTE	**DDEExecute**	**LinkExecute** method
TERMINATE	**DDETerminate**	LinkMode = None

For details about specific DDE statements and functions, see the documentation for your macro or programming language.

Opening a DDE Channel

To open a DDE channel, the destination application sends an Initiate statement or function to the source application. The Initiate statement or function has two arguments: the name of the source application and the "subject" of the DDE conversation (called the *topic*). The application name for Microsoft Query is "MSQuery."

Microsoft Query topics can be one of the following.

Topic	Description
querywindowname	The name of an open Query window. The window name can be specified only if Microsoft Query is running and a window is open.
System	A general topic that enables the destination application to link to Microsoft Query itself rather than to a Query window, a file, or an SQL SELECT statement.

When Microsoft Query receives a request for a DDE conversation about a topic it recognizes, it responds and opens a channel. The Initiate statement returns a DDE channel number, which can be assigned to a variable (for example, `Chan` or `Syschan`) and used for subsequent operations on this channel.

Note As the following examples show, applications use different Initiate statements and functions. In the Microsoft Excel macro language, the command is INITIATE; in WordBasic, it's **DDEInitiate**. For more information, see the table in "DDE Statements" earlier in this chapter.

This example uses the INITIATE function in a Microsoft Excel macro program to open a channel to an open Query window named Query1.

```
Chan=INITIATE("MSQuery","Query1")
```

The function returns a channel value, which is assigned to the variable `Chan`.

To open a DDE channel from a WordBasic program, you use the **DDEInitiate** function. For example:

```
Syschan = DDEInitiate("MSQuery", "System")
```

To open multiple windows on a single channel, use the System topic. When you use the System topic to open a DDE channel, you can activate only windows that were opened on that DDE channel.

Executing DDE Commands

You can send Execute commands to Microsoft Query using an Execute statement or function. Execute commands are specific to Microsoft Query and may or may not correspond to Microsoft Query menu commands. For example, the **Open** and **SaveAs** commands perform the same functions as equivalent menu commands in Microsoft Query, but the **ODBCLogon** and **UserControl** commands do not. (For a comparison of the Execute statements used in Microsoft Excel, Word, and Visual Basic, see "DDE Statements" earlier in this chapter.)

The Execute statement or function has two arguments.

Argument	Description
channel	The DDE channel value returned by the Initiate statement.
command	The command to send to Microsoft Query. (For the complete set of commands you can send to Microsoft Query, search Help for "DDE commands.")

To enable a user to build queries in Microsoft Query, you execute the **UserControl** command. In Microsoft Excel, the following macro statement starts Microsoft Query as a maximized application, gives the user control, and sets `My Exit Command` as the Exit command on the File menu in Microsoft Query for Windows or the Quit command in Microsoft Query for the Macintosh:

```
=EXECUTE(Chan,"[UserControl('&My Exit Command',3,True)]")
```

The DDE channel value has been previously assigned to `Chan`, and the command being sent to Microsoft Query is `UserControl`. Notice that the **UserControl** command and its parameters are enclosed in quotes ("") and square brackets ([]).

This is the equivalent statement in a WordBasic macro:

```
DDEExecute Syschan,"[UserControl('&My Exit Command',3,True)]"
```

Requesting Information

Once you've opened a DDE channel to Microsoft Query, you can return a result set or other information using a Request statement or function. (For a comparison of the Request statements used in Microsoft Excel, Word, and Visual Basic, see "DDE Statements" earlier in this chapter.)

The Request statement or function has two arguments.

Argument	Description
channel	The DDE channel value returned by the Initiate statement.
request_item	The data to be returned. This can be the contents of a field or range of fields in a Query window, or other types of information, such as the number of records in a Query window. (For other items that can be requested from Microsoft Query, see the list in the following table.)

Request items can be requested on both the query channel and the system channel. On the query channel, you can return information only about the query, such as the number of rows or columns, or the query definition. On the system channel, you can return general information about Microsoft Query, such as the current connections, topic names, and application status, as well as information specific to the active query.

Request items for a query channel or the active query on a system channel can be one of the following.

Request item	Information returned
NumRows	The number of rows (records) in the query.
NumCols	The number of columns (fields) in the query.
FieldDef	An array of values that describes the expressions and data types of the columns (fields) in the Query window. Each row of the array describes a field in the query. The array returns the following data in columnar format: the field name, type, length, and number of decimal places.
Query	The name of the query.
Recest	A rough estimate of how many rows can be fetched at a time.
ODBCSQLStatement	The ODBC SQL statement for the query. With this string, you can bypass Microsoft Query and send an ODBC SQL statement directly to ODBC for processing.
ODBCSQLStatement/*n*	An array of SQL segments (each of which can be up to *n* characters long) that make up an ODBC SQL statement. You can use this request item to store an ODBC SQL statement in several smaller segments.
QueryDefinition	The definition of the query (an SQL statement), as defined by Microsoft Query. This item can be retrieved and saved for future queries.

Request item	Information returned
QueryDefinition/*n*	An array of query definition segments (each of which can be up to *n* characters long) that make up the query definition (an SQL statement).
DataSourceName	The name of the data source used by the active query.
ErrorText	The error text, if any, from the most recently executed SQL statement. This item can be requested multiple times to retrieve all the errors that have occurred. After all errors are retrieved, the item returns an empty string. The item returns a null string if the most recently executed SQL statement was successful, even if previously executed SQL statements were not successful.
ConnectionString	The connection string used to connect to the active window. (For more information about connection strings, search Help for "ODBCLogon command.")
NameSeparator	The single character used as the ODBC qualifier name separator.
TierType	A single digit specifying the type of data source: 1 indicates a file that can contain only a single table; 2 indicates a file for a database containing one or more tables; 3 indicates the data can't be browsed. This request item is used if the application needs to provide an Open dialog box for browsing the data on a disk.

When you use the above request items on the system channel, information is returned for the Query window most recently used in a DDE operation.

For the system channel, in addition to the above request items, you can also request the following items.

Request item	Information returned
Sources	All current data source connections.
Logon	All remote databases you can connect to (from the ODBC.INI file).
Logoff	All currently connected remote databases.
Tables/*source*/*user*/*database*	All tables for the specified data source, user, and database.
Users/*source*/*database*	All users for the specified data source and database.
Database/*source*	All databases for the specified data source.
Username/*source*/*database*	The user name for the specified data source and database.

Request item	Information returned
Topics	The names of the topics open on the system channel, along with System.
Status	The status of the application, which can be Ready, Busy, or UserControl. Ready means that the application can have a DDE conversation with Microsoft Query. Busy means that Microsoft Query isn't ready to have a DDE conversation. UserControl means that Microsoft Query is running under user control (that is, another application has sent the DDE **UserControl** command to Microsoft Query). If this occurs, the application can display a dialog box with a message, start a DDE conversation with Microsoft Query on a different channel, or exit user control mode using the **Exit** command.

This example assigns the NumRows Request item to the cell A10 in a Microsoft Excel macro:

```
SET.VALUE(A10,Request(Chan,"NumRows"))
```

In a WordBasic macro, you would perform the same function by assigning a Request item value to a variable. For example, the following statement uses the **Insert** statement to insert the query definition in a Microsoft Word document:

```
Insert DDERequest$(Syschan,"QueryDefinition")
```

Fetching Data

Whereas a Request statement or function can return data to a program, the **Fetch** and **Fetch.Advise** commands deserve special mention because they retrieve data from Microsoft Query and send it directly to a worksheet or document. **Fetch** and **Fetch.Advise** are used as the *command* argument to the Execute statement or function. (For details on the Execute statement or function, see "Executing DDE Commands" earlier in this chapter.)

The following Microsoft Excel macro includes a Fetch command:

```
Chan=INITIATE("MSQuery","System")
=EXECUTE(Chan,"[UserControl('&Return to Excel',3,True)]")
=EXECUTE(Chan,"[Fetch('Excel','Sheet1','R1:R100','All')]")
=TERMINATE(Chan)
=RETURN()
```

This macro:

1. Opens a system channel between Microsoft Query and Microsoft Excel.
2. Allows the user to create or open a query.
3. Sends all the data in the Query window opened by the user to row 1 through row 100 in the Microsoft Excel worksheet named Sheet1 using the **Fetch** command.
4. Terminates the channel.

Fetch.Advise is similar to **Fetch**, except that the channel created by the first fetch isn't terminated immediately. Microsoft Query continues to send any changes to the data until the original DDE channel is closed or until Microsoft Query receives a **Fetch.Unadvise** command.

For more information on these commands, search Help for "Fetch.Advise command" and "Fetch.Unadvise command."

Exiting Microsoft Query Using DDE

To exit Microsoft Query, an application can use the **Exit** command, rather than have the user choose Exit or Quit from the File menu.

Command	Description
`Exit (False)`	Exits Microsoft Query only if no queries are open on other channels
`Exit (True)`	Exits Microsoft Query regardless of whether other queries are open

For more information on this command, search Help for "Exit command."

Closing a DDE Channel

To close a DDE channel, use a Terminate statement. (For a comparison of the Terminate statements used in Microsoft Excel, Word, and Visual Basic, see "DDE Statements" earlier in this chapter.) This statement has only one argument—the channel number of the DDE channel to be closed. All queries that are opened on this channel are closed automatically when you use a Terminate statement, and you are logged off from all connected sources.

An error is returned if the channel number you use is invalid.

This is how you terminate a DDE channel in a Microsoft Excel macro:

```
=TERMINATE(Chan)
```

Using Microsoft Query and Other Applications

Typically, other applications use Microsoft Query to accomplish three main tasks:

- To create a new query
- To update existing data
- To modify the query definition or data

Using Microsoft Query as a Data Query Tool for Users

Using DDE, you can have Microsoft Query function as a tool for retrieving data. Once your macro or program opens a DDE channel, it can activate Microsoft Query and specify which command replaces Exit on the File menu in Microsoft Query for Windows or Quit on the File menu in Microsoft Query for the Macintosh, what application state (minimized [Microsoft Query for Windows only], maximized, or restored) Microsoft Query is in, and whether to display a series of dialog boxes.

A user can then create, open, or edit a query as if Microsoft Query were running as a stand-alone application. When the user has finished building the query, she or he can choose the custom Exit command or click the Exit button on the toolbar.

Once control returns to the destination application (the document, worksheet, or object) data can be requested from Microsoft Query. For example, the user may request the number of rows or columns in the query, the SQL string defining the query, the connection string for the data source, or the data source name. Data can be returned to the destination application before the DDE channel is closed and the macro or program ends.

Example

The following Microsoft Excel macro shows how this might be done:

```
Chan=INITIATE("MSQuery","System")
=EXECUTE(Chan,"[UserControl('&Return to Excel',3,True)]")
Rows=REQUEST(Chan,"NumRows")
Cols=REQUEST(Chan,"NumCols")
=SET.VALUE(OFFSET(!B1,0,0,Rows,Cols),REQUEST(Chan,"All"))
Sql=REQUEST(Chan,"QueryDefinition")
Login=REQUEST(Chan,"ConnectionString")
Source=REQUEST(Chan,"DataSourceName")
=EXECUTE(Chan,"[Close()]")
```

```
=TERMINATE(Chan)
=RETURN()
```

In this case, the data is returned to a Microsoft Excel macro sheet.

Using Microsoft Query to Update Data

After you have executed a query and returned a result set, you may later want to update the data with whatever is then current in the data source. Using DDE, you can update data without input from the user: An application can send an SQL statement to Microsoft Query, which can execute the query and then return the result set to the destination application.

Example

This Microsoft Excel macro example opens a DDE channel, logs on to the data source, sends an SQL string, requests data, and closes the query. Data is returned to the macro sheet. The login and SQL strings can be saved from a previous query.

```
=IF(ISERROR(INDEX(REQUEST(Chan,"Status"),1)),SET.NAME("Chan",
➥  INITIATE("MSQuery","System")))
Connect=MATCH(Source,REQUEST(Chan,"Sources"),0)
=IF(ISERROR(Connect),EXECUTE(Chan,"[ODBCLogon('"&Login&"',1)]"))
=EXECUTE(Chan,"[BuildSQL('"&Sql&"')]")
=EXECUTE(Chan,"[QueryNow()]")
Rows=REQUEST(Chan,"NumRows")
Cols=REQUEST(Chan,"NumCols")
=SET.VALUE(OFFSET(B1,0,0,Rows,Cols),REQUEST(Chan,"All"))
=EXECUTE(Chan,"[Close()]")
=TERMINATE(Chan)
=RETURN()
```

Using Microsoft Query to Modify a Query Definition or Data

Another way an application can use Microsoft Query is to allow a user to modify an existing query definition in Microsoft Query or to edit data in a data source.

An application starts this process by opening a DDE channel, connecting to a data source, and sending an SQL string (saved from the previous query) to Microsoft Query to build a new query. Once the application has opened the new query, user control begins, and the user can modify the query or edit the data as needed. Once the user exits Microsoft Query, the data is returned to the application, the new query definition is saved, and the query is closed.

For example, a user working in Word could choose a custom command called "Get Sales Figures" to start the corresponding WordBasic macro,

GetSalesFigures. Without the user being aware of it, this macro could then start Microsoft Query, build a query, and then return the sales data to the Word document.

Example

The following Microsoft Excel macro shows how this could be done. The results are returned to cell A1 on a worksheet named Sheet1.

```
=IF(ISERROR(INDEX(REQUEST(Chan,"Status"),1)),SET.NAME("Chan",
➥ INITIATE ("MSQuery","System")))
Connect=MATCH(Source,REQUEST(Chan,"Sources"),0)
=IF(ISERROR(Connect),EXECUTE(Chan,"[ODBCLogon('"&Login&"',1)]"))
=EXECUTE(Chan,"[BuildSQL('"&Sql&"')]")
=EXECUTE(Chan,"[QueryNow()]")
=EXECUTE(Chan,"[UserControl('&Return Data',3,False)]")
Rows=REQUEST(Chan,"NumRows")
Cols=REQUEST(Chan,"NumCols")
=EXECUTE(Chan,"[Fetch('Excel','Sheet1','R1C1:R"&Rows&"C"&Cols&"',
➥ 'All')]")
Sql=REQUEST(Chan,"QueryDefinition")
=EXECUTE(Chan,"[Close()]")
=TERMINATE(Chan)
=RETURN()
```

APPENDIX A

The Northwind Traders Sample Data

One way to learn how to use Microsoft Query is to experiment with it using sample data. Microsoft Query for Windows comes with sample data from Northwind Traders, a fictional import/export company that specializes in gourmet foods from around the world. Many of the examples in the Microsoft Query documentation are based on the Northwind Traders data, which is in dBASE format. Although this data is not available with Microsoft Query for the Macintosh, you'll still find the examples helpful as you learn Microsoft Query.

Using the Northwind Traders Data

When you create a new query, you access the Northwind data by selecting the NWind data source in the Select Data Source dialog box. This data source is installed when you set up Microsoft Query. Before you can use the NWind data source, you must make it available.

▷ **To make the NWind data source available for querying**

1. From the File menu, choose New Query.
2. In the Select Data Source dialog box, choose the Other button.

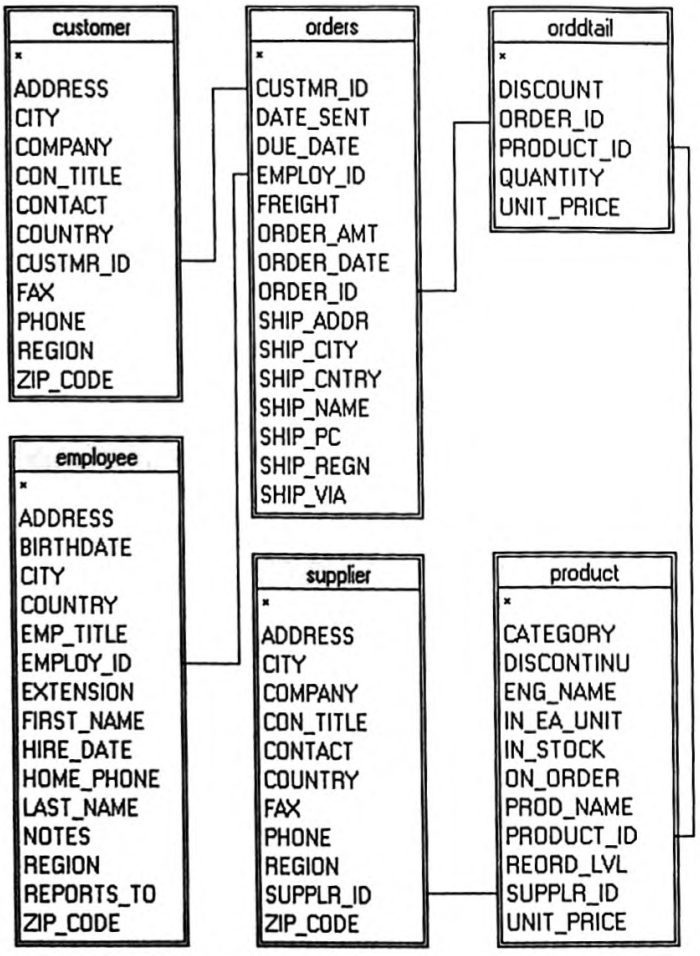
   Microsoft Query displays the ODBC Data Sources dialog box, which lists all the data sources installed on your computer, including the NWind data source.
3. In the list of data sources, double-click NWind (or select it, and then choose the OK button).

   Microsoft Query redisplays the Select Data Source dialog box. The Available Data Sources list now includes the NWind data source, which is selected.
4. Choose the Use button to use the NWind data source for your query.

More Information For information on selecting a data source and creating a query, see Chapter 1, "Getting Started with Queries."

The Structure of the Northwind Data

The following join diagram shows the structure of the Northwind data and illustrates how the tables are related. Each table is represented by its field list. The lines connecting the field lists show how the tables are joined through matching fields.



More Information For information on how to create a join diagram, see "Creating a Join Diagram" in Chapter 6, "Creating Multiple-Table Queries."

APPENDIX B

ODBC Drivers: Requirements, Installation, and Adding Data Sources

With Open Database Connectivity (ODBC) drivers, you can use Microsoft Query to access data in a variety of data sources. A *data source* includes the data you want to access and the information needed to get to that data. Two examples of data sources are a directory or folder containing a set of dBASE files; and an SQL Server database, the server on which it resides, and the network used to access that server. You can add a data source after you install an ODBC driver that meets the necessary requirements.

This appendix describes the requirements an ODBC driver must meet to be used with Microsoft Query; it also explains how to install an ODBC driver and add a data source for an installed driver.

ODBC Driver Requirements

Before you install a driver, you should make sure that it satisfies the criteria in the following table. The table lists the basic requirements that ODBC drivers must meet to be compatible with Microsoft Query.

Category	Microsoft Query requirements
API conformance	ODBC Level 1 Conformance
Aggregate functions	**Count, Max, Min, Avg, Sum**
Comparison operators	**=, >, <, >=, <=, <>**
Logical operators	**And, Or, Not**
Other operators	**In, Between, Like, Is Null, Is Not Null**
Wildcard characters	A percent sign (%) represents zero or more characters. An underscore (_) represents a single character.

Category	Microsoft Query requirements
SQL grammar	Core-level grammar
	Date/time escape clause syntax
	Outer-join escape clause syntax (if outer joins are supported)
	Procedure invocation escape clause syntax (if procedures are supported)
	GROUP BY/HAVING
Miscellaneous	Conversion of all types to SQL_C_CHAR

Installing ODBC Drivers

If you didn't install one of the drivers that came with Microsoft Query when you set up the Microsoft Query application, you can still add it. If you've already set up Microsoft Query for Windows, use the following procedure to install one of the ODBC drivers that came with Microsoft Query for Windows. For information on installing a driver for Microsoft Query for the Macintosh, see the documentation that comes with the driver.

▶ **To install an ODBC driver using the ODBC Control Panel option in Windows**

1. In the Main group in the Program Manager window, choose the Control Panel icon.
2. In the Control Panel window, choose the ODBC icon.

   When you start the ODBC Control Panel option, you can choose the Help button on each screen to get Help on entering information.

   Note If you're using Windows version 3.0, start the ODBC Administrator by choosing the Microsoft ODBC Administrator icon in the Microsoft ODBC group.

3. In the Data Sources dialog box, choose the Drivers button.
4. In the Drivers dialog box, choose the Add button.
5. In the text box in the Add Driver dialog box, type the name of the drive and directory for the driver.

   -Or-

   Choose the Browse button to select a drive and directory name.
6. Choose the OK button.

7. In the Install Drivers dialog box, choose the driver you want to install from the Available ODBC Drivers list.
8. Choose the OK button to install the driver.

Note The driver you install may share some of the same dynamic link libraries (DLLs) as other drivers installed on your computer. If so, Microsoft Query will ask if you want to overwrite the driver you specified, whether or not it has been installed. Choose the Yes button to install the driver.

For information on deleting an ODBC driver that came with Microsoft Query for Windows, click "ODBC Drivers" in the Microsoft Query Help Contents, and then click the name of the driver whose Help you want to see. Search for "deleting drivers."

Adding Data Sources for Installed Drivers

If the data source you want isn't listed in the ODBC Data Sources dialog box, you can add the data source to the list providing the driver it uses is already installed on your machine. For both the Windows and Macintosh versions, you can add data sources from within Microsoft Query. You can also add data sources using the ODBC Control Panel option in Microsoft Query for Windows or the ODBC Configuration Manager Control Panel option in Microsoft Query for the Macintosh.

▶ **To add a data source using the ODBC Control Panel option in Windows**

1. In the Main group in the Program Manager window, choose the Control Panel icon.
2. In the Control Panel window, double-click the ODBC icon.

Note If you're using Windows version 3.0, start the ODBC Administrator by choosing the Microsoft ODBC Administrator icon in the Microsoft ODBC group.

3. In the Data Sources dialog box, choose the Add button.

   The Add Data Source dialog box is displayed.
4. In the Installed ODBC Drivers list, select the driver for which you want to add a data source, and then choose the OK button.
5. In your driver's Setup dialog box, enter the information necessary to set up the data source, such as a data source name and database directory.

To get Help on entering information in this screen, choose the Help button.

6. When you've finished entering the information, choose the OK button.

   The data source you've set up is displayed in the Data Sources list.

7. If you want to add more data sources, repeat Steps 3 through 6. When you've finished adding data sources, choose the Close button in the Data Sources dialog box.

▶ **To add a data source using the ODBC Configuration Manager Control Panel option on the Macintosh**

1. Double-click the System folder.
2. Double-click the Control Panel folder, and then double-click the ODBC Configuration Manager Control Panel.
3. In the Manage Data Sources dialog box, choose the Add button.

   The Select DBMS Driver dialog box is displayed.

4. In the Installed ODBC Drivers list, select the driver for which you want to add a data source, and then choose the OK button.
5. In your driver's Setup dialog box, enter the information necessary to set up the data source, such as a data source name and database folder.
6. When you've finished entering the information, choose the OK button.

   The data source you've set up is displayed in the Manage Data Sources list.

7. If you want to add more data sources, repeat Steps 3 through 6. When you've finished adding data sources, choose the Close button in the Manage Data Sources dialog box.

▶ **To add a data source from within Microsoft Query**

1. Display the Select Data Source dialog box by doing either of the following:
   - From the File menu, choose New Query, Save As, or Table Definition.
   - From the File menu, choose Execute SQL, and then choose the Data Sources button.
2. In the Select Data Source dialog box, choose the Other button.

   Microsoft Query displays the ODBC Data Sources dialog box.

3. Choose the New button.

   Microsoft Query displays the Add Data Source dialog box in Microsoft Query for Windows and the Select DBMS Driver dialog box in Microsoft Query for the Macintosh. The dialog box contains a list of the ODBC drivers installed on your machine.

4. In the Installed ODBC Drivers box, select the driver for the data source you want to add, and then choose the OK button.

   Microsoft Query displays the dialog box specific to the data source you're adding. This dialog box asks for additional information, such as the name you want to use for the data source and the network path and protocol. (The name you assign to the data source is the name that will appear in the ODBC Data Sources dialog box.)

5. Complete the dialog box, and then choose the OK button.

   Microsoft Query redisplays the ODBC Data Sources dialog box with the data source you just added.

6. If you want to add more data sources, repeat Steps 3 through 5. When you've finished adding data sources, choose the OK button in the ODBC Data Sources dialog box.

   To use the data source for querying, follow the procedure in "Selecting a Data Source" in Chapter 1, "Getting Started with Queries."

Note You may want additional information about modifying and deleting data sources for drivers that came with Microsoft Query. In Microsoft Query for Windows, click "ODBC Drivers" in the Microsoft Query Help Contents, and then select the driver whose Help you want to see. In the driver Help, search for the topic you want. In Microsoft Query for the Macintosh, see the documentation that came with the driver.

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